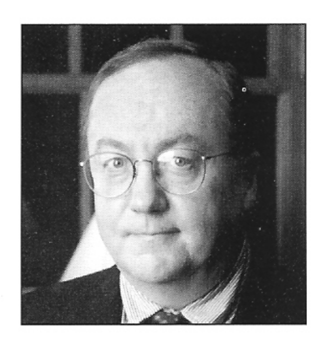
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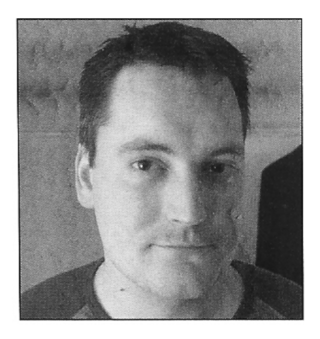


D-Day Fortifications in Normandy

Steven J Zaloga · Illustrated by Hugh Johnson



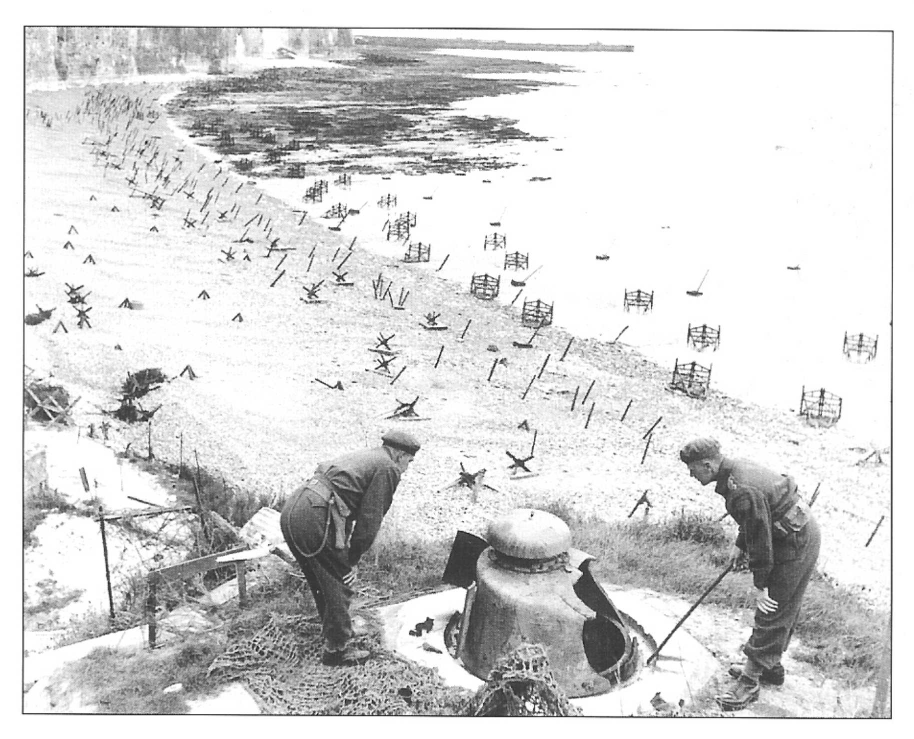
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Fortress • 37

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Series editors Marcus Cowper and Nikolai Bogdanovic

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For brevity, the usual conventions have been used when referring to German and American units. In the case of German units, 2/GR.726 refers to 2nd Company, Grenadier Regiment 726; 3/HKAA.1261 indicates the 3rd Battery, Army Coastal Artillery Battalion 1261. In the case of US units, 1/393rd Infantry refers to the 1st Battalion, 393rd Infantry Regiment.

Glossary

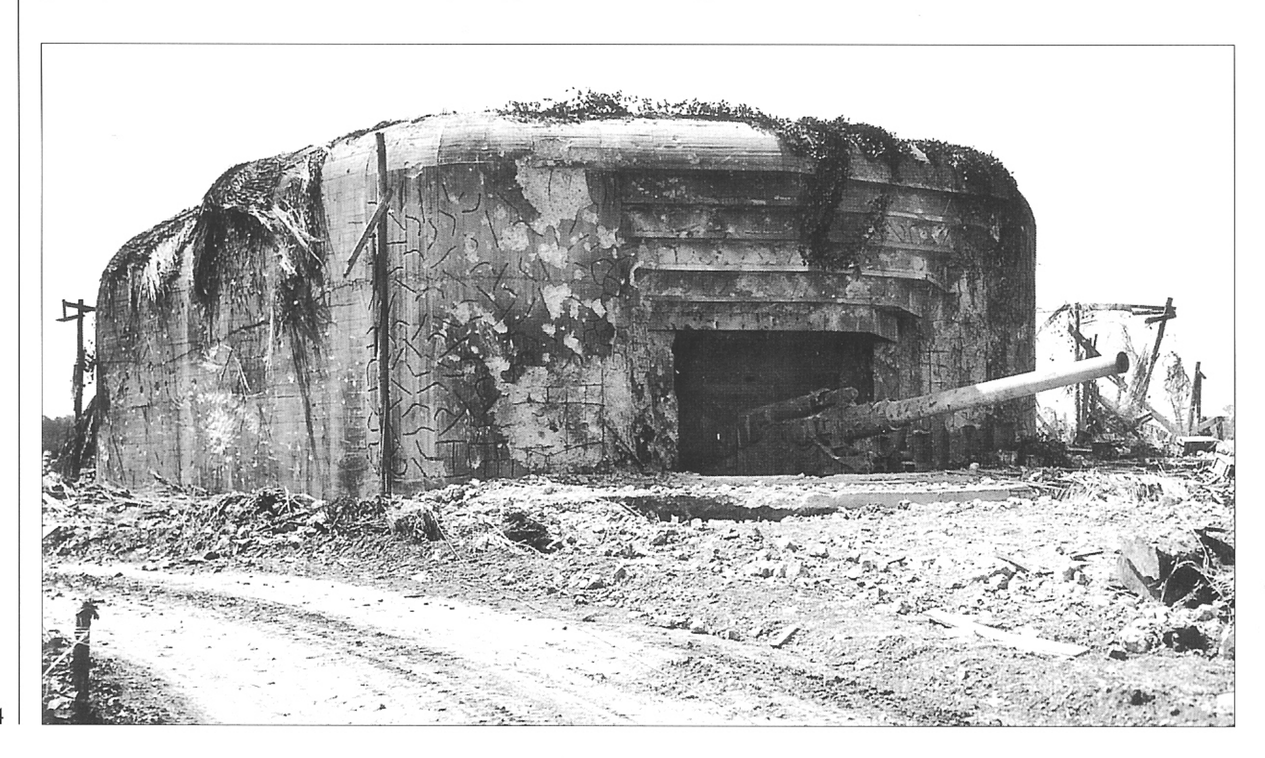
Bauform: construction plan
Festung: fortress
GR: grenadier regiment
HKAA: *Heeres-küsten-artillerie-abteilung*, army coastal artillery battalion
IR: infantry regiment
MAA: *Marine-artillerie-abteilung*: navy artillery battalion
OB: *Offene Bettung*; open platform
Regelbau: construction standard
StP: *Stützpunkt*, strongpoint (company-sized)
Tobruk: a class of small bunkers with circular openings for a crew-served weapon
Vf: *Verstarkfeldmässig*; reinforced field position such as a tobruk
Westwall: German fortifications created in the late 1930s on the Franco-German border, also known as the Siegfried Line
WN: *Wiederstandnest*, strongpoint (platoon-sized); sometimes abbreviated as "W" in the 709th Infantry Division sector

Contents

Introduction

German defenses along the Normandy beaches were part of the larger Atlantic Wall fortifications, intended to defend Fortress Europe from an Allied amphibious invasion. Hitler's grandiose scheme for impregnable coastal defenses proved unrealistic due to the enormous length of the coast to be defended and the limited resources available to the exhausted German war economy. Due to strategic misperceptions about the Allied plans, German coastal defenses were concentrated on the Pas de Calais rather than in Normandy. In addition, German doctrine preferred to concentrate coastal defenses around key ports and to repel amphibious landings away from ports using mobile forces. When Field Marshal Erwin Rommel was appointed to take command of the invasion front in late 1943, he re-examined the basic assumptions about coastal defense and began a program to enhance fortifications along the Normandy coast. Rommel believed that any Allied invasion would have to be stopped immediately on the beach, and so insisted that more effort be made to defend the coastline between the ports. His most important contribution to the defenses was an extensive program of improvised beach obstructions to complicate any landing attempt. As a part of this program, there was a belated effort in the spring of 1944 to fortify the Côte de Nacre in lower Normandy, the D-Day beach area. German resources were inadequate to rapidly construct defenses-in-depth along the most threatened areas of the coast, and those along the Normandy beaches were hasty and incomplete at the time of the D-Day landings on June 6, 1944. The German defenses quickly failed when assaulted by Allied forces on D-Day, a reminder of the military adage of Frederick the Great, "who defends everything, defends nothing."

The most potent fortification to take part in the D-Day fighting was the Crisbeq battery of 3/HKAA.1261 located near Saint-Marcouf. Only two H683 casemates for its four Skoda 210mm K39/40 guns were completed by D-Day. After engaging in prolonged gun duels with Allied warships off Utah Beach on D-Day, the battery was the scene later of intense ground combat, which earned its commander, Oberleutnant zur See Ohmsen, the Knight's Cross. (NARA)



Design and development

Coastal defense had been the responsibility of the Kriegsmarine (navy) since the reforms of Kaiser Wilhelm II in 1888. Kriegsmarine doctrine focused on the defense of German ports, not on repelling major amphibious attacks. In World War I, the Kriegsmarine's resources proved to be inadequate for coastal defenses outside of Germany, for example in Flanders, so the army had to be brought in to assist. After World War I, the Kreigsmarine remained responsible for coastal defense, so the army ignored this mission. German army fortification engineering concentrated on land defense, a capability influenced by the experiences of World War I and brought up to date with the construction of the Westwall (Siegfried Line) along the French border in the late 1930s.[1]

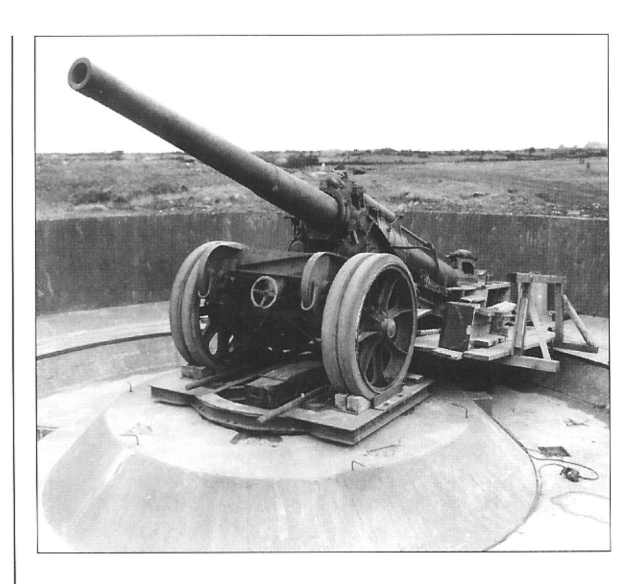
At the time of World War II, the Kriegsmarine did not have an autonomous coastal defense force, but rather the coastal defense mission was the responsibility of regional commanders. In the case of the Normandy beach area, Sea Defense Command-Normandy led by Rear Admiral Hennecke in Cherbourg was subordinate to Adm. Krancke of Naval Command West. From a naval perspective, coastal defenses included short-range submarines, torpedo boats, mine warfare and coastal artillery. Due to the limited space here, the primary focus is on the Navy's shore-based coastal defenses.

The Kriegsmarine coastal artillery was considered an adjunct of the sea force, and its traditional missions were to engage enemy ships near the shore, protect harbor entrances and support friendly warships in combat. Engagement of land targets and defense against enemy landing forces were only secondary missions. As a result, the Kriegsmarine coastal artillery force was based primarily on large-caliber guns suitable for engaging enemy warships rather than on small-caliber artillery more suitable for use against large numbers of landing craft. The Kriegsmarine's coastal defense efforts in France were concentrated near the ports both due to its traditional doctrine, and the widespread view that the Allies' main objective would be a port.

The Kriegsmarine did not have the resources to conduct a defense along the thousands of kilometers of coastline under German control in 1941, so once again the army was gradually brought in to assume more and more responsibility for this mission. This began piecemeal in the autumn of 1940 when the army's artillery branch was brought in to reinforce the navy's coastal batteries for planned operations against Great Britain, including the construction of fortified long-range artillery positions on the Pas de Calais. When Operation Sealion failed to materialize, the mission of the Wehrmacht forces in France shifted from offense to defense. Gradually, German infantry divisions being used for occupation duty took over more and more of the coastal defense mission.

In 1941–42 the German occupiers began to consider how to deal with future threats, and the planning concentrated on the most likely objectives such as ports and harbors. Starting in December 1941, the OB West (Commander-in-Chief West) began to designate some of these ports as fortified areas (*Festungsbereichen*). The port defenses would include both seaward and landward approaches since the Wehrmacht worried that the Allies could stage airborne landings behind the ports. These initial defensive efforts were quite modest due to a lack of resources and included ordinary field entrenchments as well as concrete fortifications.

1. For further information on the Siegfried Line, see: Neil Short, Fortress 15: *Germany's West Wall* (Osprey: Oxford, 2004)





ABOVE LEFT This provides a good example of the type of kettle emplacements first built along the Normandy coast, in this case one of the six 155mm K420(f) gun emplacements at StP 152 near Gatteville. This type of emplacement is patterned after the World War I style, and appropriately enough the gun seen here is a captured French St. Chamond Modele 1916, a type widely used in Normandy due to its excellent 21km range. (NARA)

ABOVE RIGHT The shift from kettle emplacements to fully enclosed casemates is well illustrated here in this overhead view of one of the batteries of 7/HKAA.1261 at Gatteville, to the northwest of Utah Beach, armed with the 155mm K420(f) gun. Four of the H679 were still under construction on D-Day, so the gun is still seen in its original kettle emplacement. (NARA)

The army did not have a specific coastal defense doctrine and its existing tactical doctrine was not inclined toward the use of linear coastal defense tactics as a response to an amphibious invasion. Instead, the German army generally dealt with amphibious landings by staging vigorous counterattacks against the beachhead as soon as possible. This doctrinal preference was evident in the German response to the Allied landings on Sicily in July 1943, Salerno in September 1943, and Anzio in January 1944; these landings were not contested in their initial phase with coastal defenses. The one exception was the Wehrmacht's successful repulse of the British/Canadian raid on Dieppe in 1942, which took place at a heavily defended port, already fortified by the Kriegsmarine in accordance with their traditional port defense mission.

Germany was gradually provoked into linear coastal defense in France by the frequent British Commando raids. In the wake of the British raid on St. Nazaire in February 1942, Hitler issued Fuhrer Directive 40 on March 23, 1942, that ordered the construction of fortifications along the Atlantic coast. This scheme was not based on accepted Wehrmacht doctrine, but reflected Hitler's infatuation with grand architectural projects and the romantic allure of impregnable fortresses guarding continental Europe. The Wehrmacht high command, preoccupied with the war against Russia, paid little attention to this program.

The Wehrmacht's *Festungspionere Korps* (Fortress Engineer Corps) had been created in the late 1930s for designing and supervising the construction of fortifications. When the first major prewar fortification project, the Westwall, began in the late 1930s, the corps was too small to actually conduct its construction. As a result, the construction work was undertaken by the paramilitary Organization Todt that had been responsible for the construction of the German autobahn. This pattern remained the same in France, with the *Festungspionere* developing the fortification plan, and Organization Todt undertaking the construction. Much of the work in France was contracted out to local French firms and at its peak strength in mid-1943, only 6 percent of Todt's workforce in France were Germans.

On August 13, 1942, Hitler held a meeting with the Reichsminister Albert Speer and the senior OB West engineer staff and made clear the strategic aim of the Atlantic Wall. "There is only one battle front [the Eastern Front]. The other fronts can only be defended with modest forces." He outlined a plan to defend the 3,800km (2,400 miles) of coastline from Spain to Norway using 15,000 bunkers and 300,000 troops to be completed by May 1943, the earliest time an Allied invasion was likely. Hitler insisted that priority would be given to the ports and lower priority to the open beaches in between. Only two sites in Normandy

were given the *Festung* (fortress) designation, Cherbourg and Le Havre. Of the 15,000 Atlantic Wall bunkers, 11,000 were allocated to the Seventh and Fifteenth Armies stretching from Brittany to the Dutch coast, including Normandy.

Organization Todt focused on the coasts closest to Britain along the Pas de Calais and Picardy since these were believed to be the most likely sites for an Allied invasion. Of the planned 15,000 bunkers, Organization Todt completed 9,671 permanent bunkers and 5,976 field-type bunkers by D-Day. However, a large fraction of the uncompleted fortifications were in areas away from the *Festung* ports, and the Seventh Army sector, which included the D-Day beaches, was generally about six weeks behind the Fifteenth Army sector on the Pas de Calais.

The August 19, 1942, raid on Dieppe strongly influenced German fortification plans. The success of the defenses in repelling the attack reinforced Hitler's view of the importance of the Atlantic Wall. The fighting suggested the need to reinforce gun batteries with infantry strongpoints and to replace the open "kettle" coastal gun emplacements (*Kesselbettungen*) based on World War I designs by more complete casemates that offered protection from air attack.

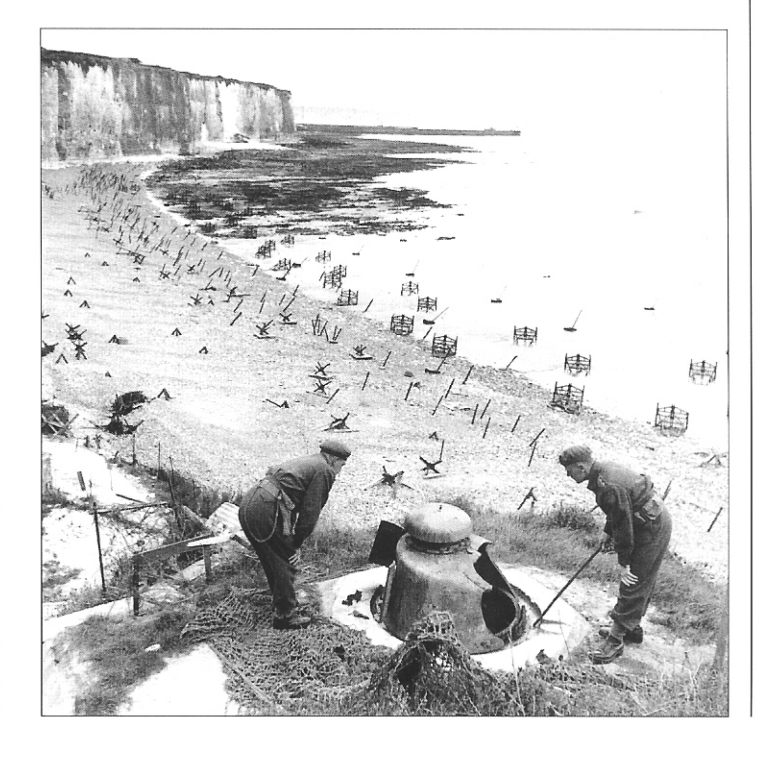
The Atlantic Wall construction became a favorite subject of German propaganda with frequent newsreels and photographic coverage of the impregnable defenses. The costs were substantial, even if the propaganda image of impregnable defense was a gross exaggeration. In the two years up to D-Day, Organization Todt used 13 million cubic meters of concrete at a cost of DM3.7 billion, as well as using about 5 percent of total German steel production.

Case 3a: Normandy

The OB West considered seven major invasion scenarios, designating a landing in the Seventh Army's Normandy sector as Case 3a. In this scenario, the landing was expected to take place near the Seine estuary around Le Havre to the east of the eventual D-Day beaches. Since resources were still limited, priority went to areas where invasion landings were deemed most likely, especially the Fifteenth Army sector on the Pas de Calais. The only areas in Normandy that received any significant attention were the *Festung* ports of Cherbourg and Le Havre and, to a lesser extent, Dieppe. A final strategic assessment in March 1944 concluded that the Allied invasion site would most likely be on the Pas de Calais, astride the Seine Estuary, or along the eastern shore of upper Normandy (Haute Normandie), in that order.

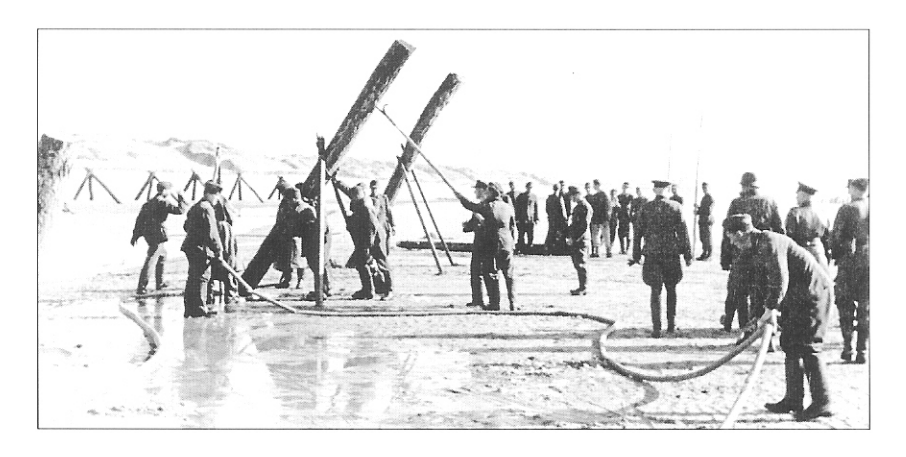
Aside from the *Festung* ports, lower Normandy (Basse Normandie) including the Côte de Nacre (Pearl Coast) had few concrete fortifications until early in 1944. As an economy-of-force solution, the army deployed a network of interlocking coastal artillery batteries. At first, they were installed in inexpensive, open "kettle" emplacements and were equipped mainly with captured foreign artillery or obsolete German guns. German infantry units on occupation duty patrolled the areas between the batteries thinly.

On his appointment as the new OB West commander in the spring of 1943, Generalfeldmarschall Gerd von Rundstedt ordered a comprehensive inspection of the coastal defenses that was completed in October 1943. The report was a scathing indictment of a program that had been cursed with a lack of resources due to the



Rommel's most important initiative in Normandy was to stiffen the defenses with coastal obstructions to complicate any landing attempt. This stretch of beach near Dieppe gives a good idea of the density of these obstacles and they include the usual mixture of the large Belgian gates, as well as smaller Czech hedgehogs, wooden stakes and steel tetrahedons. These two Canadian officers are examining a *Panzerstellung* based on a tobruk. The front of the World War I French Renault FT tank's Girod turret has been shattered by naval gunfire. (Ken Bell, NAC PA134448)

Rommel inspects the Normandy beaches in March 1944 while troops from the local infantry company install stakes using high-pressure water-hoses, a time-saving innovation that he promoted to accelerate the construction of beach obstructions. (MHI)



low priority of the Western Front compared to Russia. The only zone assessed to have limited defensive readiness was in the Fifteenth Army sector on the Pas de Calais and, even there, the average divisional sector was 100km, permitting little more than a thin cordon defense. To put this in some perspective, German tactical doctrine of the time felt that a divisional frontage of 6 to 10km was prudent. To make matters worse, the quality of the troops manning these defenses was almost without exception below standard since the divisions in the west were regularly "combed out" by the army to send the fittest troops to Russia. What was left were older troops; ambulatory troops still suffering the effects of frostbite, wounds and illness; unreliable *Volksdeutche* troops recruited from scattered German communities in Eastern Europe, and other second-rate troops. The situation was further exacerbated in 1943 when Berlin ordered OB West to turn over 20 of its better battalions in return for 60 battalions of Ost troops recruited from former Soviet prisoners-of-war.

Hitler's response to von Rundstedt's inspection was Fuhrer Directive 51 on November 3, 1943, which accepted von Rundstedt's findings and took steps to halt the constant drain of forces out of France to Russia. In theory, this reversed former priorities, and recognized the need to strengthen defenses in the West in view of the likelihood of an Allied invasion in 1944. The most immediate outcome of this directive was the assignment of Generalfeldmarschall Erwin Rommel to head the newly created Army Group for Special Employment (later Army Group B) to direct the invasion front. Rommel's first assignment was to inspect the coastal defenses. He began in Denmark, working his way down the coast to France.

Although Rommel's previous command in northern Italy had not involved him in the attempts to repel the Allied landings at Salerno in September 1943, the conduct of the operation worried him deeply. The Wehrmacht's established tactics to deal with amphibious landings, namely a concerted counterattack by



Rommel insisted that the 352nd Infantry Division put more of its forces in view of the beach, and one of the outcomes was that additional weapons were moved on to the bluffs overlooking Omaha Beach. This is a 75mm PaK 40 anti-tank gun, rarely seen on the Normandy beaches as it was reserved for assault infantry divisions, not the type of static divisions used for coastal defense. (NARA)

panzer and panzergrenadier divisions several days after the landing, had failed to push the Allies back into the sea. Rommel began to question the existing Wehrmacht doctrine and sought other solutions. He recalled his own difficulties dealing with British defensive positions and minefields in the North African campaign, such as at El Alamein, and he began to ponder the role of defensive obstructions and fortifications in the defense of France against the expected Allied invasion.

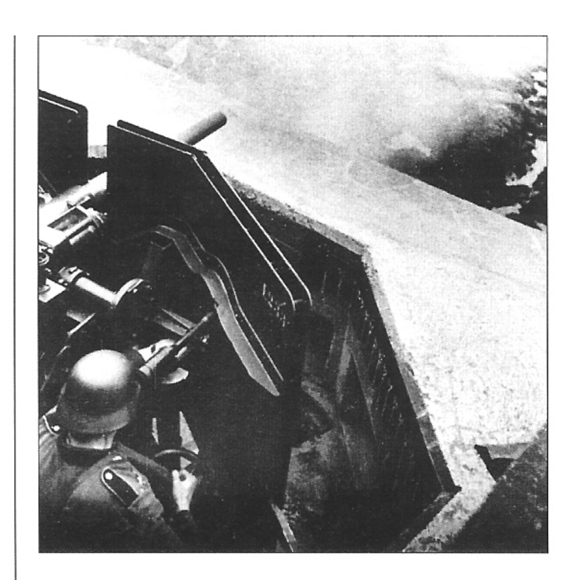
Construction of the fortifications along the Normandy coast was undertaken by Organization Todt's *Oberbauleitung Cherbourg* (Chief Construction Directorate – Cherbourg), responsible for the coast from Cabourg to Mont Saint-Michel. Up to the time of the D-Day landings, OBL Cherbourg built 913 concrete emplacements including 540 permanent bunkers (176 shelters, 28 command posts, 262 combat bunkers, 34 observation posts, 8 communication centers and 32 supply bunkers); 28 artillery emplacements; and 345 field-type bunkers (tobruks, open gun pits) amounting to about 65 percent of the emplacements that had been assigned under Hitler's 1942 plan. The diversion of the Organization Todt to other assignments in 1943, such as the reconstruction of the Ruhr dams after the British attacks and the construction of new V-weapon sites, delayed the completion of many fortification efforts in Normandy. Fortification in lower Normandy on the Côte de Nacre from the Vire to the Orne Rivers, the future D-Day beaches, was almost nonexistent by December 1943 except for a handful of scattered coastal gun positions.

The army itself had a difficult time compensating for the shortfalls since its own fortification construction resources were very limited. The *Festungspionere Korps* generally allotted a single *Festungspionere Stab* (Fortification Engineer Staff) to each army corps. These units were roughly regimental in size, divided into three sector groups (*Abschnittsgruppen*) each with a geographic responsibility and assigned a single engineer battalion to carry out their tasks. In the case of the 7th Army's 84th Corps responsible for the Vire-Orne sector, this was Festungspionere Stab 11 commanded by Col. Walter Garbsch from April 1943 to May 1944. Although it originally had the normal three sector groups, one of these had been removed to help construct fortifications in southern France. Abschnittsgruppen I covered the Cherbourg peninsula to the Isigny area (Utah Beach), while Abschnittsgruppen II covered further east to Riva Bella, thereby covering four of the five D-Day beaches. Col. Garbsch did not have specialized fortress architecture training, so the design of the Normandy beach defenses was entrusted to Col. von Stiotta, the head of the Seventh Army's Festungspionere Stab 19, who had been a fortress engineer in the prewar Austrian army.

When Rommel insisted that fortification efforts in Normandy be accelerated in January 1944, three more engineer battalions were put under the direction of Fest. Pio. Stab 11, two for constructing bunkers and one for mine laying. But the shortage of workers and supplies in the spring of 1944 meant that many planned fortifications were not completed or even started by D-Day. For example, there had been plans to complete a major defensive work near Utah Beach to secure Carentan, but this never took place. The Kriegsmarine intended to deploy heavy-caliber naval coastal batteries in Normandy, including 380mm gun batteries at both Le Havre and Cherbourg in range of the D-Day beaches. These plans were badly delayed and the Le Havre battery near Octeville was heavily damaged during construction by a major Allied air attack on April 10, 1944.

Principles of defense

The Kriegsmarine gradually lost control over coastal defense during the course of the war, especially in the areas away from ports. Isolated naval gun batteries such as those at Crisbeq and Longues-sur-Mer were subordinated to army command in 1943. The debate over tactics between the army and navy ended in late 1943 when von Rundstedt imposed a more unified command structure.





ABOVE LEFT One of the most common defensive positions on the Normandy coast were open Vf600 gun emplacements like the one seen here armed with a pedestal-mounted 50mm gun. This particular example is armed with the shorter KwK 39, based on obsolete tank guns of the type used earlier in the war on the PzKpfw III tank. (MHI)

ABOVE RIGHT Priority for defensive structures went to the ports, which often had elaborate enclosed bunkers of the type found on the Westwall. This shows the interior of a machine-gun bunker in the port of St. Malo with its retractable MG34 machine gun with protected telescopic sight. This was a considerable contrast to the elementary machine-gun tobruks and slit trenches used on the D-Day beaches. (NARA)

Once fighting began, each coastal defense sector (KVA: *Küsten-Verteidigungs-Abschnitten*) fell under a single commander. In the case of the Côte de Nacre, this was the army's local divisional commander: KVA-H1 covered the 716th Infantry Division sector from the Orne River to Arromanches (Sword, Juno and Gold Beaches), KVA-H2 covered the 352nd Infantry Division sector from Arromanches to the Vire River (including Omaha Beach) and KVA-J1 in the 709th Infantry Division sector covered from the Vire River along the eastern coast of the Cotentin peninsula to the west of Cherbourg (including Utah Beach). As a result of these trends, it was the army rather than the navy that shaped the defensive tactics in 1944.

By the summer of 1943, the German high command began to realize that the Anglo-American amphibious doctrine was not as dependent on the seizure of ports as had been expected; this was evident from the landings on Sicily and at Salerno in Italy. Something had to be done about the areas between the ports, and a thin screen of coastal artillery batteries was little deterrent.

The army had considerable experience in the defense of fortified lines, most notably its experience from World War I. German tactics in 1917–18 evolved into a type of elastic defense that was based on defense-in-depth.[2] German defensive tactics evolved since 1918 due to the advent of mobile warfare and the experiences of the Russian front.[3] However, conventional infantry tactics were an inadequate model for the defense of the French coast since they did not exploit the vulnerability of the enemy amphibious force during its approach to the beach. The tactical doctrine that began to emerge in 1943 was based on tactics in use on the Eastern Front, but adapted to the peculiarities of coastal defense. Since the coast was too long for true linear defense, the tactics depended upon linear clusters of small strongpoints, a "chain of pearls," that could serve as the skeleton of a defense.

The tactics substituted concrete and firepower for manpower, allowing relatively weak infantry divisions to cover defensive sectors far longer than would be assigned to units with more conventional missions. Armed with small-caliber artillery and machine guns, these strongpoints could engage enemy amphibious forces during their approach to the beach. If additional infantry was available, the strongpoints could serve as the main nodes of the

2. For further information, see: Paddy Griffith, Fortress 24: *Fortifications of the Western Front 1914–18*, (Osprey: Oxford, 2004)

3. For further information on German defensive tactics, see: Gordon Rottman, Fortress 23: *German Field Fortifications 1939–45* (Osprey: Oxford, 2004)





coastal defensive belt, with the additional infantry deployed in conventional field entrenchments in between or behind. The strongpoints served as the initial barrier to an Allied amphibious force until larger mobile forces could be moved into position for a decisive counterattack. The network of strongpoint groups (*Stützpunktgrupp*) consisted of a chain of company-sized strongpoints (*Stützpunkt*) and platoon-sized resistance points (*Wiederstandnest*). In addition, the strongpoint groups would be supported by the existing network of army and navy coastal artillery batteries, which had the twin functions of attacking Allied landing forces on the approach to the beach as well as engaging them once on the shore. Strongpoints could be manned by second-rate troops and equipped with obsolete German or captured weapons. Senior commanders such as von Rundstedt did not view this doctrine as ideal, but in view of the lack of troops and the expectation that the Allies' objective would be a major French port, the strongpoint tactics were better than nothing.

ABOVE LEFT Normandy had lower priority than the Pas de Calais for concrete, so many of the German infantry positions were ordinary slit trenches like these from the WN66 strongpoint on the east shoulder of the St. Laurent draw, D-3, on Omaha Beach. (NARA)

ABOVE RIGHT When possible, German engineers attempted to camouflage bunkers. In the seaside resort areas, observation bunkers like the one seen here in neighboring Le Havre has been camouflaged to resemble a local house. (NARA)

During the course of his inspection of existing coastal defense in the winter of 1943/44, Rommel began to formulate his own views of the best tactics for anti-invasion defense and he began to doubt the approach advocated by von Rundstedt and the OB West. Rommel became increasingly convinced that more emphasis had to be paid to the areas away from the ports. He felt that the invasion had to be stopped cold on the beaches and disputed the existing concept that a landing would be turned back only after the commitment of reserve formations stationed some kilometres away from the coast. This had been attempted on Sicily, at Salerno and, most recently, at Anzio in January–February 1944. In each case, the counterattack had been smothered by Allied naval gunfire. As a result, Rommel argued against relying on defense-in-depth and mobile counterattacks and he wanted as much firepower as possible located around the beaches themselves.

When Rommel visited the Grandcamp sector on January 29–30, 1944, he remarked on the similarity between the future Omaha Beach to Salerno and insisted that special attention be paid to reinforcing the defenses. A German officer later recalled Rommel's remarks to the officers gathered around him: "This bay will be reinforced quickly against a likely Allied



Some construction in Normandy made use of a mixture of prefabricated concrete blocks and poured concrete, like this view of the rear of one of the H679 gun casemates at Pointe-du-Hoc. (Author)

landing because the destiny of Europe will be played out here." As a result, Omaha Beach received heavier defenses than any of the neighboring D-Day beaches.

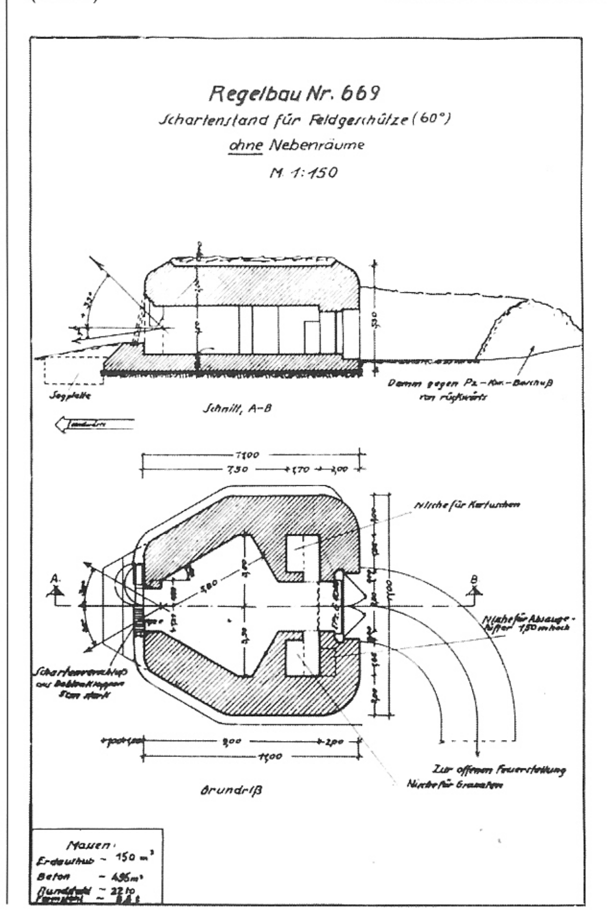
Rommel's unconventional approach led to bitter arguments with other senior commanders. Gen. Sodenstern commanding the Nineteenth Army in southern France argued that "No man in his senses would put his head on an anvil under the swing of the blacksmith's hammer, so no general should mass his troops at the point where the enemy is certain to strike the first powerful blow of his superior weaponry." This debate about anti-invasion tactics continued to rage until the Allied landings on D-Day. In the end, neither view prevailed due to Hitler's prevarication.

Fortification construction

From a technical standpoint, the German Normandy fortifications were modern designs based on a wealth of experience. Nearly all construction was based on state-of-the-art techniques and especially the use of ferro-concrete, that is concrete using steel reinforcing bars (rebar). Other types of steel was used only where necessary, notably in roof construction and in reinforcement around key areas such as gun embrasures; armor plate was limited to only the most essential requirements, such as armored rear doors of major bunkers.

There were several categories of construction strength, the best being Category E, which had 5m-thick exterior walls and ceilings and was reserved for the Führer bunkers and some special facilities, including V-weapons launch bunkers. Category A was the best grade for standard military fortifications and used a 3.5m basic thickness. This category was used for U-boat pens, some heavy gun casemates and some radar bunkers. The most widely used category on the Atlantic Wall was Category B, which was 2m thick, and this was commonly used on gun casemates and personnel shelters. Category B1 was a modification of this standard for small structures such as tobruks, which called for 1 to 1.2m thickness; this standard was also widely used in Normandy.

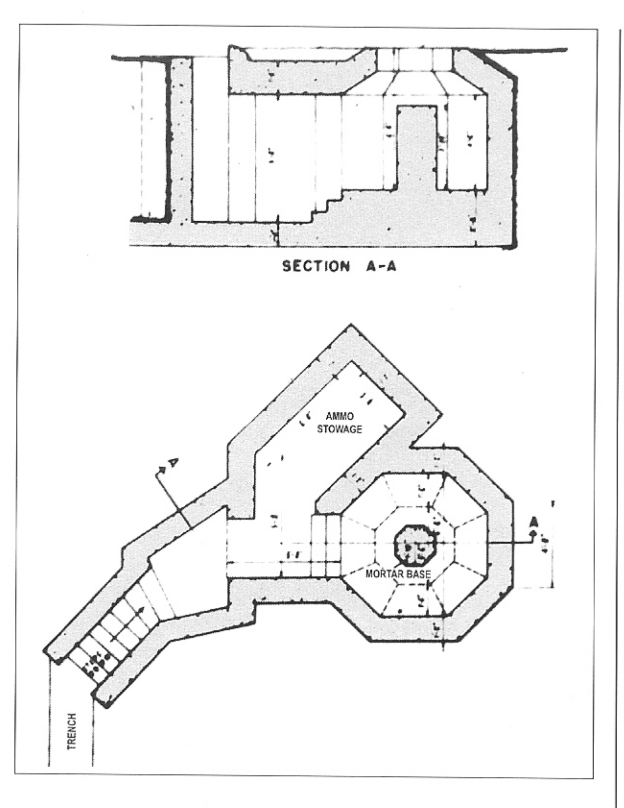
This is an example of an actual *Regelbau* plan for a gun casemate, in this case the H669, a type used in Normandy at several sites including the Merville battery and St. Martin. (NARA)



The *Festungspionere Korps* drew up architectural plans for all major fortifications and these received a standardized designation. The 1937–38 programs developed a family of semi-permanent field entrenchments that received OB or Vf designations for *Offene Bettung* (open platform) or *Verstarkfeldmässig* (reinforced field position). During the 1939–45 construction, additional designs were standardized. There is some disparity in how these designs are identified, so, for example, the "611" bunker design is variously called *Bauform* 611 (construction plan 611); R611 (*Regelbau* 611: construction standard 611) or H611 (Heer 611: Army 611) to distinguish army bunkers from air force (L: Luftwaffe) and navy (M: Kriegsmarine) bunker designs. The small, reinforced field fortifications sometimes retained their older OB and Vf designations, but in other cases they received a new *Regelbau* designation. There were about 700 of these standard designs of which about 250 were used on the Atlantic Wall, and of these about 50 were common in the D-Day beach area. In addition, there were localized variations of standard plans, sometimes identified with an SK suffix for *Sonderkonstruktion* (special design).

The fortification designs were also lumped into two broader classes, permanent and field-type. Permanent fortifications referred to those in Category B and above, such as artillery casemates and personnel bunkers,

which were designed to withstand aerial bombs and heavy artillery. The field-type fortifications were less substantial and included smaller types as tobruks and open gun pits that were not fully protected. The defenses along the D-Day beaches tended to fall into the later category, and the 352nd Infantry Division at Omaha Beach estimated that only 15 percent of its defenses fell into the "bomb-proof" or permanent category. Construction began so late along the D-Day beaches that many positions still used earthen field entrenchments and not concrete bunkers. So for example along Utah Beach, about 64 percent of the emplacements were concrete while at Omaha Beach, only 44 percent of the 167 positions were concrete. In the case of Omaha Beach, the late arrival of the 352nd Infantry Division accounts for the relatively large percentage of earthen field entrenchments while the other beaches had ratios more akin to those at Utah Beach.



One of the most common types of tobruks found on the Normandy beaches was this Vf61a octagonal emplacement for the 50mm Festunggranatwerfer 210(f). This differed from other types of tobruk in having a mortar base in the center as well as an ammunition stowage chamber to one side. (NARA)

The three most important criteria in German fortification design were fire effect, protection, and cover, roughly in that order. To the extent possible, fortifications were merged into the local terrain both for the added protection offered by entrenchment as well as the concealment value. Bunkers were constructed no larger than necessary to improve the protection for a given thickness of concrete and to minimize their target size. Personnel shelters were generally located within defensive positions to take advantage of their weapons and, where possible, they were completely buried. Entrances were also provided with an earthen glacis or wall to prevent the use of large-caliber direct-fire weapons against their armored doors.

A variety of techniques were used to camouflage defensive works. The most elementary was the positioning of the bunker to best take advantage of local terrain features. Where possible, the bunker would be enclosed in earth and many designs had a shallow depression on the roof specifically to permit a thin cover of earth. Nevertheless, some elements of the concrete inevitably were visible. The most common approach was to use camouflage netting for the larger structures. In the case of gun casemates, the forward side of the casemate was almost always covered by a camouflage net to hide the embrasure. On the enfilade casemates, hooked extensions of rebar were allowed to protrude from the concrete to act as anchors for the camouflage. The 50mm gun pits usually had some form of overhead camouflage, with one of the more common types resembling an umbrella that provided shade to the gun crew and camouflaged the position from aerial observation. Other forms of camouflage were also used such as pattern-painted camouflage, textured concrete and paint, or structural disguises to make the bunkers appear like civilian structures.

In general, the quality of German fortification construction deteriorated during the war from their high-point in the late 1930s on the Westwall. This was due to changes in design that accepted less steel reinforcing bar due to wartime shortages, as well as to deteriorating construction standards such as poor concrete. This offered little consolation to the average Allied infantryman facing these bunkers. For example, the US Army's 3in. gun on the M10 tank destroyer could penetrate about 22 to 48in. of bunker wall, but it should be recalled that the Category B bunkers were 80in. (2m) thick. The only way for ground troops to knock out a Category B bunker was direct fire through the open gun embrasure or, if lucky, direct fire against the rear armored door.

Tour of the site

Shore defense

Defense against amphibious attack at sea remained a Kriegsmarine responsibility and the navy had both deep-water mines and coastal mines for this mission. Deep-water mines are largely outside the scope of this book, but in the event they were not particularly significant on D-Day. Due to the strong currents in the Seine Bay, minefields had to be periodically refreshed to be effective and there were not enough mines available to do so regularly. As a result, Naval Force West's preferred tactic was dubbed *"Blitzsperren,"* or lightning barrage; the idea being that the mine-laying force would wait until an invasion was imminent and then sortie forth and quickly lay minefields. An effort to deploy mines in the Seine Bay off the invasion beaches on the night of May 23, 1944, was frustrated by Allied counteraction after the plans were discovered in advance by an Enigma signals intelligence decrypt, leading to a highly effective Royal Navy and RAF attack on German minelayers.

The *Schwimmende Balkenmine* was an improvised anti-craft mine consisting of a half-dozen Teller mines strapped to a wooden raft. These were anchored off the invasion beaches to concrete bases or to other obstructions. In the background is one of the ubiquitous Czech hedgehog obstructions. (MHI)



After the Dieppe raid, the Kreigsmarine showed more interest in deploying controlled minefields in shallow water. These were used primarily in port areas such as Cherbourg and Le Havre, and not off the rest of the Normandy coast due to the time and expense of creating and operating such minefields. The Kriegsmarine developed an inexpensive, mass-produced, shallow-water anti-craft mine called the KMA (*küstenmine-A*: coastal mine-A), which consisted of a concrete base containing a 75kg explosive charge surmounted by a steel tripod frame with the triggering device. Although cheap and effective, they became available too late. They were first laid in the high-priority areas along the Channel coast from Boulogne south-westward towards Le Havre by early June 1944. The next area to be mined was the Seine Estuary around Le Havre, which was to begin on June 10, but this never took place due to the invasion.

The lack of KMA mines prompted Rommel's headquarters to develop a family of improvised anti-craft devices that could be built in large numbers using locally available materials. In March 1944, Naval Group West developed and tested their own *Nussknackermine* (Nutcracker mine), which was an improvised copy of the KMA using a concrete base containing an explosive device such as a French high-explosive artillery projectile, with a pivoting steel rod that pressed against the projectile fuze when a landing craft came in contact with it. Other

improvised coastal mines used the same concept but different methods of mounting and triggering the explosive charge. Deployment of these began in April 1944, initially at priority locations including the Channel coast and Brest. The performance of these improvised mines was erratic due to the effect of water on submerged munitions not designed for submersion. In addition, German garrisons in some sectors found that the mines tended to be damaged or upset by tidal currents, with the triggering beam being particularly vulnerable.



Hemmbalk were a more substantial obstacle developed in the spring of 1944 when it became evident that the simpler stakes were not effective against an on-rushing landing craft. They were usually topped with a Teller mine to blow a hole in the hull of the landing craft. (MHI)

Simpler anti-craft mines such as the *Minenpfahl* were created using conventional land mines such as the Teller anti-tank mine, mounted on stakes along the shore. The *Schwimmende Balkenmine* consisted of several Teller mines strapped to a wooden raft that was held in placed by a rope or chain fastened to a concrete anchor. The *Armsperre* mine placed a single Teller mine on a float, and then fixed the mine using chain or metal bars to a concrete anchor, creating a cheap coastal equivalent of conventional naval mines. The effectiveness of these mines was mixed due to the effect of seawater on mines not designed for frequent emersion. However, the motto at Rommel's headquarters was "better to do something imperfect than nothing at all."

There were never enough high-explosive devices to create coastal minefields along the entire Normandy coast, so Rommel and his headquarters developed a variety of obstacles to interfere with landing craft. This was Rommel's single most important contribution to the defense of the Normandy coast. During a visit to Hardelot-Plage on February 3, 1944, Rommel was shown a technique



Cointet obstacles, also called Belgian gates or Element C, were widely used as obstructions on the Normandy beaches. This example is preserved at the Omaha Beach museum in the Saint Laurent draw. (Author)



German troops install a steel tetrahedron along the Normandy shore in the spring of 1944. These were usually secured by concrete anchors. (MHI)

developed locally by troops of using a high-pressure water hose instead of a pile driver to emplace wooden stakes. This took only three minutes per stake as compared to 45 minutes using a pile driver. Subsequently, Rommel ordered this technique to be used in Normandy to create extensive obstacle barriers of *Hochpfählen* (high stakes) created from telegraph poles, metal beams and other material. In some sectors, such as Sword Beach, the rocky conditions did not permit the use of fire hoses, and the slower pile drivers had to be used.

In the haste to create these barriers, little attention was initially paid to their actual effectiveness in stopping landing craft. In mid-February 1944, the Seventh Army tested some of the obstacles using a British landing craft captured at Dieppe. The landing craft plowed through many of the obstacles, especially the stakes. As a result, more substantial *Hemmbalk* (beam obstructions) were developed based on a tripod design. The less substantial vertical stakes remained in use, but often improved by the addition of mines as mentioned before. Another addition to the stakes was the *Stahlmesser* metal saw teeth to cut into the lower hull of the landing craft.

Besides locally created obstacles, Rommel also sponsored an effort to collect existing obstacles from fortified areas elsewhere in Europe that were not being used at the time. The *Tschechenigel* (Czech hedgehog) steel anti-tank obstacles were collected, as their name implies, from prewar Czech fortified areas. They were transferred to Normandy and fixed in shallow water by embedding their steel arms in concrete anchors. Another common obstacle in the coastal waters of Normandy was the Cointet obstacle, also known as Belgian gates or "C-elements." These were large steel obstructions designed by Col. Leon De Cointet in 1933 for the Maginot Line. Although rejected by the French Army, some 75,000 were manufactured for Belgium and they were used along the border to obstruct roads. Many of these 1,400kg obstacles were collected in 1944 and deployed off the Normandy coast, as well as in the intended role as road obstacles further inland. Besides these captured obstacles, tetrahedron obstacles were mass-produced in Germany or locally assembled, and were also used in Normandy to thicken the shallow-water obstacle belts.

Beach obstacle deployment by 84th Corps in Lower Normandy, June 1, 1944

Type	*Number of obstacles*	*Avg. density per km*
Concrete stakes	4,634	23.2
Wooden stakes	10,939	54.7
Mines (in tidal area)	6,589	32.9
Concrete tetrahedrons	4,912	24.6
Hemmbalken	4,722	23.6
Belgian gates	2,375	11.9
Czech hedgehog	15,932	79.6
Curved anti-tank ramps	2,252	11.3

By June of 1944, the Fest.Pi.Stab 11 of 84th Corps had completed 205km of continuous coastline obstructions out of the 320km of coastline under its responsibility. Priority had been given to coastal areas more likely to be assaulted, so beaches edged by cliffs were the last to receive attention. All of the D-Day beaches had obstacles installed, though some were more effectively blocked than others. For example, stretches of the beaches near Utah Beach proved unsuitable for many of these obstructions due to tidal action that undermined or washed them . Sword Beach had less extensive obstacle belts due to the rocky shoreline that inhibited the use of stake obstacles. Areas of the British/Canadian beaches were lined with high sea walls, so this affected obstacle planning. While the average density of obstacles along the Normandy coast was about 260 per kilometer, the D-Day beaches had much higher densities than average, ranging from a low at Sword Beach of 300 per kilometer to a high at Omaha Beach of about 490 per kilometer. Those at Omaha consisted of 3,700 obstacles including 450 ramps, 2,000 stakes, 1,050 hedgehogs and 200 Belgian gates. The table opposite summarizes the extent of this obstacle effort.

Beyond the coastal obstacles, the Wehrmacht deployed an array of conventional barriers including barbed-wire entanglements and minefields. The minefields were generally located beyond the beaches, as the tidal action tended to disrupt any planted on the beach itself. Through the end of 1943, some 1.7 million mines had been laid in belts along the coast, and Rommel planned to expand this to 50–100 million mines. This did not prove feasible as the rate of supply from Germany at the time was around 40,000 mines per month, but by the time of the invasion some 4 million mines had been laid along the French coast. The 716th Infantry Division, which was responsible at the time for the D-Day beaches, laid 62,000 mines by February 1944, increased to 100,000 by March 1944. Due to the shortage of conventional mines, there were several different types of improvised mines used in Normandy. There were several hundred thousand French naval gun projectiles in arsenals that were converted into mines by fitting contact fuzes. Some of the beaches lined with cliffs had improvised mines deployed, made from old French or German artillery projectiles. The *Minengranaten* were simply artillery rounds strung on the cliff with an impact fuze that would fall off and explode if disturbed. The *Rollminen* were a more deliberate weapon, consisting of a similar artillery round and impact fuze, but lashed to the cliff by a rope that had to be cut for the mine to fall and explode. US troops on the western side of Omaha Beach encountered these types of improvised mines.

Since mines were not well suited to the beaches due to tidal action, the Wehrmacht planned to deploy a less conventional alternative, the Goliath remote-control demolition vehicle. These small tracked vehicles were controlled via a wire that trailed from a spool at the rear. They were intended to be steered against high-value targets such as landing craft and tanks, and when they were near their 60kg (130lb) explosive charge could be remotely detonated. They were generally positioned under cover in small individual shelters near the beach. Only a few units received these in time, such as the platoons along Utah Beach, while other units received them a few days before the invasion



The Wehrmacht attempted to use the Goliath remote-control demolition vehicles for coastal defense against the Allied landings at Anzio and again in Normandy, in both cases without success. This is a small underground shelter for a Goliath created near W5 on Utah Beach, which proved to be ineffective when the preliminary bombardment severed the control wires. (MHI)

and did not have time to properly prepare them for use, such as the platoons stationed on Omaha Beach.

A variety of conventional techniques were used to obstruct tank movement off the beach, including anti-tank ditches, anti-tank walls, concrete caltrops/tetrahedrons (*Betonigel*) and various types of steel anti-tank obstructions such as the *Eiserne hemmkurven*, a type of prefabricated curved anti-tank ramp.

Rommel also insisted that the areas immediately behind the beaches be prepared against paratroopers and glider landings. Larger fields were studded with vertical posts that were intended to interfere with glider landings. There were plans to link these stake defenses together with wire obstructions but this was not completed before D-Day. Efforts were made to mine main suitable landing zones, but a shortage of mines limited the effectiveness of this program. Besides these obstacles, a program began in the spring of 1944 to flood the tidal areas behind the beaches. This was intended both to limit the available fields suitable for glider landing and to serve as a barrier to mechanized advance off the beach by Allied forces. In most respects, the flooding operations proved to be far more successful in complicating Allied airborne landings plans than did the obstacles, which were not robust enough to actually stop a glider landing.

Fortified strongpoints

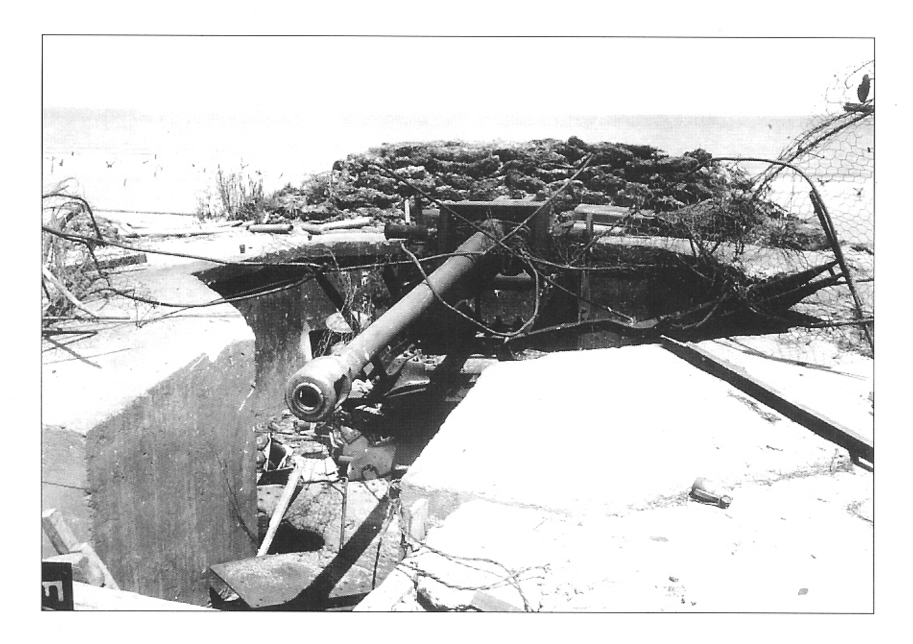
The level of fortification of the D-Day beaches fell between the heavily fortified *Festung* ports and ordinary field entrenchments. While the Côte de Nacre defenses did have a significant number of concrete defenses, the most common types were small, partially open tobruks and open gun pits, not the fully enclosed bunkers typical of the Westwall or the *Festung* ports.

The strongpoints varied considerably in layout to best exploit local terrain for increased protection. So, for example, the strongpoints on Omaha Beach were constructed in clusters around the gullies leading off the beach in order to channel the Allied invaders into narrow killing zones. On the eastern beaches in the British/Canadian sector, the defenses were often built to take advantage of the existing seawalls and numerous solid buildings in the resort towns along the coast. The basic defensive concept for strongpoints was the so-called *Igel* (hedgehog) approach, with the bunkers, gun casemates and other positions arranged to provide interlocking fire. Each position was assigned a sector of defense, and its weapons were also designed to cover the dead spaces of nearby positions. A typical strongpoint contained about five tobruks armed mainly with machine guns plus a few mortars, two to four gun positions, and two or three personnel/storage/command bunkers. Within a line of company strongpoints, there would usually be one or more of the heavy anti-tank gun bunkers for interlocking enfilade fire along the whole beach.

By far the most common bunker types in Normandy were the tobruks. These were a family of small bunker designs so named after Italian fortifications used during the fighting around Tobruk in 1942. They were more formally called *Ringstand*, since they were based around a single

Anti-tank ditches were widely used along the D-Day beaches to channel the armor into killing zones and prevent exit off the beach. They were often filled with water, as seen in this example from Omaha Beach. (NARA)





A good example of the common Vf600e open gun emplacement from the strongpoint near Fort Foucarville in the Utah Beach sector. This one is armed with a 50mm pedestal gun with its usual shield blown off during the fighting and lying inside the gun-pit. These emplacements were frequently covered with camouflage and a wire camouflage cage can be seen to the right. The emplacement has been given modest protection from naval fire by a sandbag wall. (NARA)

circular opening reminiscent of a ring mount. The tobruks were most commonly used as machine-gun pits for a single machine-gun team, but they were also used as a firing pit for 50mm infantry mortars and other small weapons. They could also be used to create a *Panzerstellung* when fitted with one of the small turrets from captured French tanks. The most common *Panzerstellung* type on the Normandy beaches used turrets from the World War I-vintage Renault FT tank, or the more modern APX-R turret with 37mm gun used on the 1940-era French Renault R-35 or Hotchkiss H-39 tank.

While the tobruks were better than earth entrenchments, they were not as resistant to attack as the types of fully enclosed machine-gun bunkers found in the Westwall or in the *Festung* ports. Since their principal weapon was situated in a circular opening, they could be disabled by close infantry attack. By contrast, the fully enclosed machine-gun bunkers required far more substantial means, often point-blank fire from large-caliber artillery.



Tank turrets mounted on tobruks were a common feature of the Normandy defenses and this example of a "U" pattern tobruk with World War I Renault FT tank turret was located near one of the breakwaters in Grandcamp harbor between Utah and Omaha Beach. (NARA)

German strongpoints on D-Day Beaches

Strongpoint	*Location*	*Unit*	*Major weapons (bunker type)*
Utah			
W7 (WN105)	La Madeleine	3/IR.919	company command post
W5 (WN104)	La Grande Dune	2/IR.919	50mm (H667); 2 x 50mm (Vf600); 75mm FK38 (H612); 1 FT *Panzerstellung*
W4 (WN103)	La Madeleine	2/IR.919	
Omaha			
WN73	Near D-1 draw	11/GR.726	75mm FK231(f) (casemate)
WN72	D-1 draw	11/GR.726	88mm (H667); 75mm Pak 97/38(f) (pit); 50mm (casemate)
WN71	D-1 draw	11/GR.726	1 AT gun
WN70	D-1/D-3 draw	10/GR.726	80mm FK17(t) (H612); 75mm field gun (pit), 20mm Flak
WN69	D-3 draw	9/GR.726	20mm Flak
WN68	D-3 draw	9/GR.726	50mm (Vf600); 47mm Pak 181(f) (open pit); 2 *Panzerstellung*
WN67	St. Laurent	Nebel Abt.84	40x320mm *Nebelwerfers*
WN66	D-3 draw	8/GR.726	50mm (Vf600); other AT gun (pit); 2 *Panzerstellung*
WN65	E-1 draw	8/GR.726	50mm (H667); 50mm (Vf600); 75mm (open pit)
WN64	E-1 draw	7/GR.726	76.2 IKH 290(r); 20mm Flak
WN63	Cabourg	HQ III/GR.726	Company command bunker
WN62	E-3 draw	1/GR.726	2 x 75mm FK235(b) (H669); 2x50mm (pit)
WN61	E-3 draw	1/GR.726	88mm (H677); 2 x 50mm (Vf600); 1 *Panzerstellung* (APX-R)
WN60	F-1 draw	1/GR.726	2 x 75mm FK231(f); 20mm Flak; 1 *Panzerstellung* (APX-R)
Gold			
WN40	Puits d'Herode	Ost.441	observation bunker, tobruks
WN39	St. Come-de-Fresne	Ost.441	radar, 2 x 75mm FK 38 (H612)
WN38	St. Come-de-Fresne	Ost.441	2 x 50mm (casemate/mod Vf600)
WN37	Le Hamel	Ost.441	75mm FK (H612); 50mm (casemate)
WN36	Cabane des douanes	Ost.441	50mm (Vf600)
WN35	Hable de Heurlot	3/Ost.441	6 bunkers
WN35a	Mt. Fleury	3/HKAA.1260	4 x 122mm K390/1 (r) (H679)
WN35b	Hable de Heurlot	5/AR.1716	4 x 100mm leFH 14/19(t) (H669)
WN34	Mt. Fleury lighthouse	7/GR.736	50mm
WN33	La Riviere	7/GR.736	88mm(H677); 50mm (H667); 50mm (Vf600)
WN32	Ver-sur-Mer	6/AR.1716	4 x 100mm leFH 14/19 (t) (H669)
Juno			
WN31	Courseulles	6/GR.736	75mm FK 16 nArt (H612) + 2 x 50mm
WN30	Courseulles	6/GR.736	Reinforced houses
WN29	Courseulles	6/GR.736	88mm (H677); 75mm FK16 nArt (H612); 75mm FK231 (f) (H612); 50mm; 1 *Panzerstellung*
WN28a	Beny-sur-Mer	7/AR.1716	4 x 100mm IFH 14/19(t)
WN28	Bernieres-la-Rive	5/GR.736	75mm PaK 40 (H604); 50mm (timber casemate); 1 *Panzerstellung* (FT)
WN27	St. Aubin-sur-Mer	5/GR.736	50mm (Vf600 mod)
WN26	Langrune-sur-Mer	9/GR.736	75mm KF 231 (f) (field entrenchment)
Sword			
WN21 (Trout)	Lion-sur-Mer	10/GR.736	1 x 75mm; 2 x 50mm (Vf600)
WN20 (Cod)	La Breche	10/GR.736	88mm/H677, 3 x 50mm
WN18	Hermanville-la-Breche	10/GR.736	88mm (H677) + 2 x 50mm (casemates); 1 x 50mm (Vf600)
WN10(B)	Riva Bella	2/GR.736	75mm howitzer FK 38 (H626), 1 50mm
StP Caen 08	Riva Bella	1/HKAA.1260	6 x 155mm K418 (f) (gun pits); 1 *Panzerstellung* (APX-R)
WN17 (Hillman)	Colleville-Plage	HQ/GR.736	2 x AT guns (H605)
WN16 (Morris)	Colleville-Plage	2/AR.1716	4 x 100mm FH 14/19 (t) (H669)
WN15	St. Aubin	GR.736	Billets
WN14 (Sole)	Ouistreham	HQ I/GR.736	battalion headquarters
WN12 (Daimler)	Ouistreham	4/AR.1716	4 x 155mm FH 414 (f) (H669); 2 x 20mm Flak

Notes:
AR = artillery regiment IR = infantry regiment GR = grenadier regiment HKAA = army coastal artillery battalion

Most Normandy strongpoints contained one or more artillery weapons, and they were fortified in a variety of ways. The single most common weapon along the Normandy beaches was the German 50mm anti-landing gun in one of its various versions. This had been the principal German tank and anti-tank gun in 1940–42, but with the advent of the thickly armored T-34 and KV tanks on the Russian front, it had become obsolete. Surplus 50mm KwK 39 and KwK 40 tank guns as well as the towed PaK 38 version were remounted on new pedestal mounts (*Sockellafetten*) with a new spaced armor shield. These were primarily intended for use against landing craft or enemy infantry, and were usually mounted in Vf600 open concrete gun pits for full 360-degree traverse. A small portion of the 50mm guns were mounted in fully casemented bunkers such as the H667 to provide better protection against air attack and naval gunfire, but these better bunkers were usually reserved for larger-caliber guns. The 50mm guns were supplemented with a wide variety of other artillery weapons, usually old field guns in the 75–77mm range. Guns used in Normandy ranged from World War I Austrian mountain guns to World War II Soviet 76mm divisional guns. Some strongpoints mounted the field guns in fully enclosed bunkers, but in other cases they were simply deployed in field entrenchments.

Among the most lethal fortifications deployed in Normandy strongpoints were a family of special casemates designed for enfilade fire by heavy anti-tank

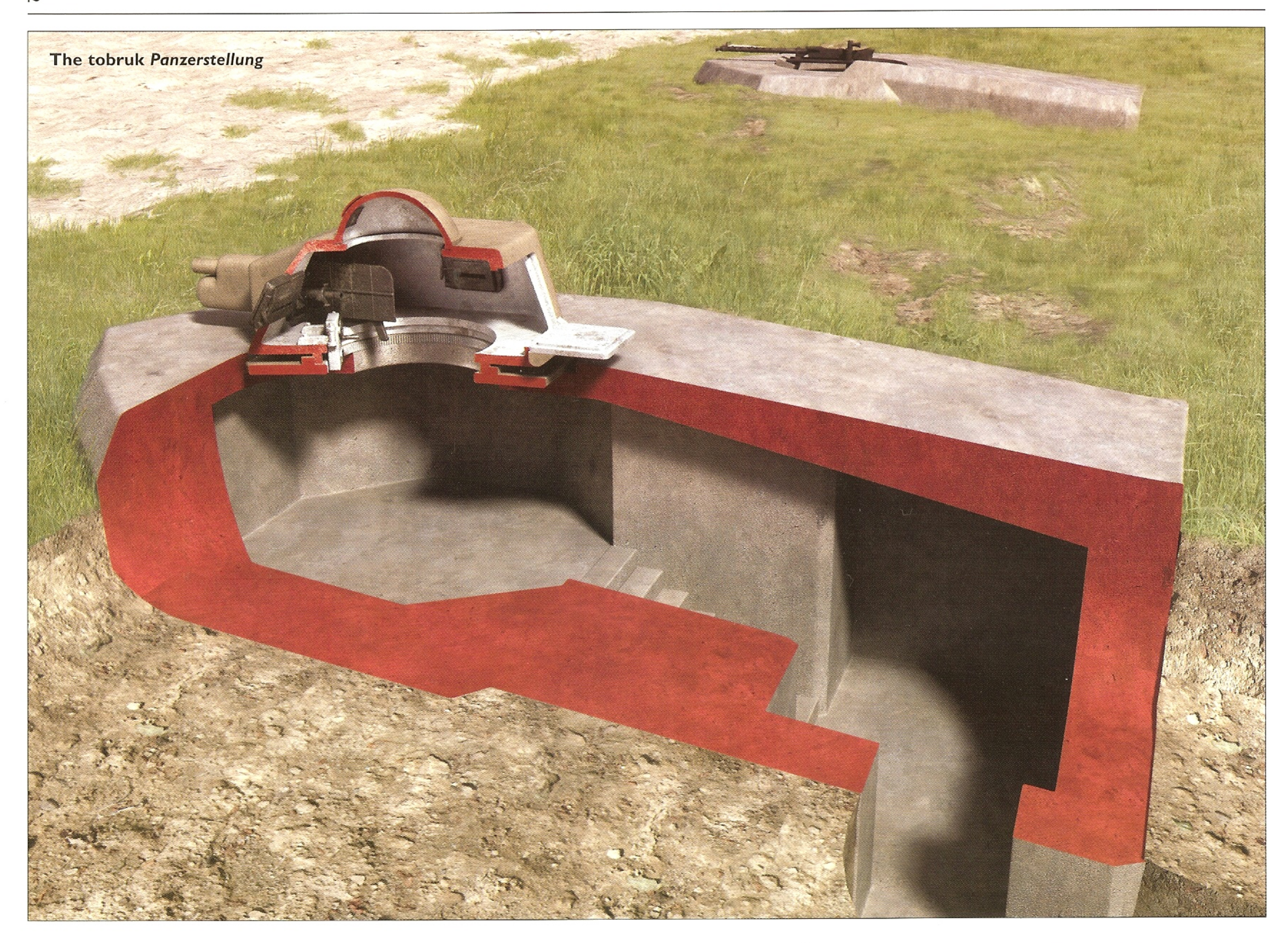
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The tobruk *Panzerstellung*

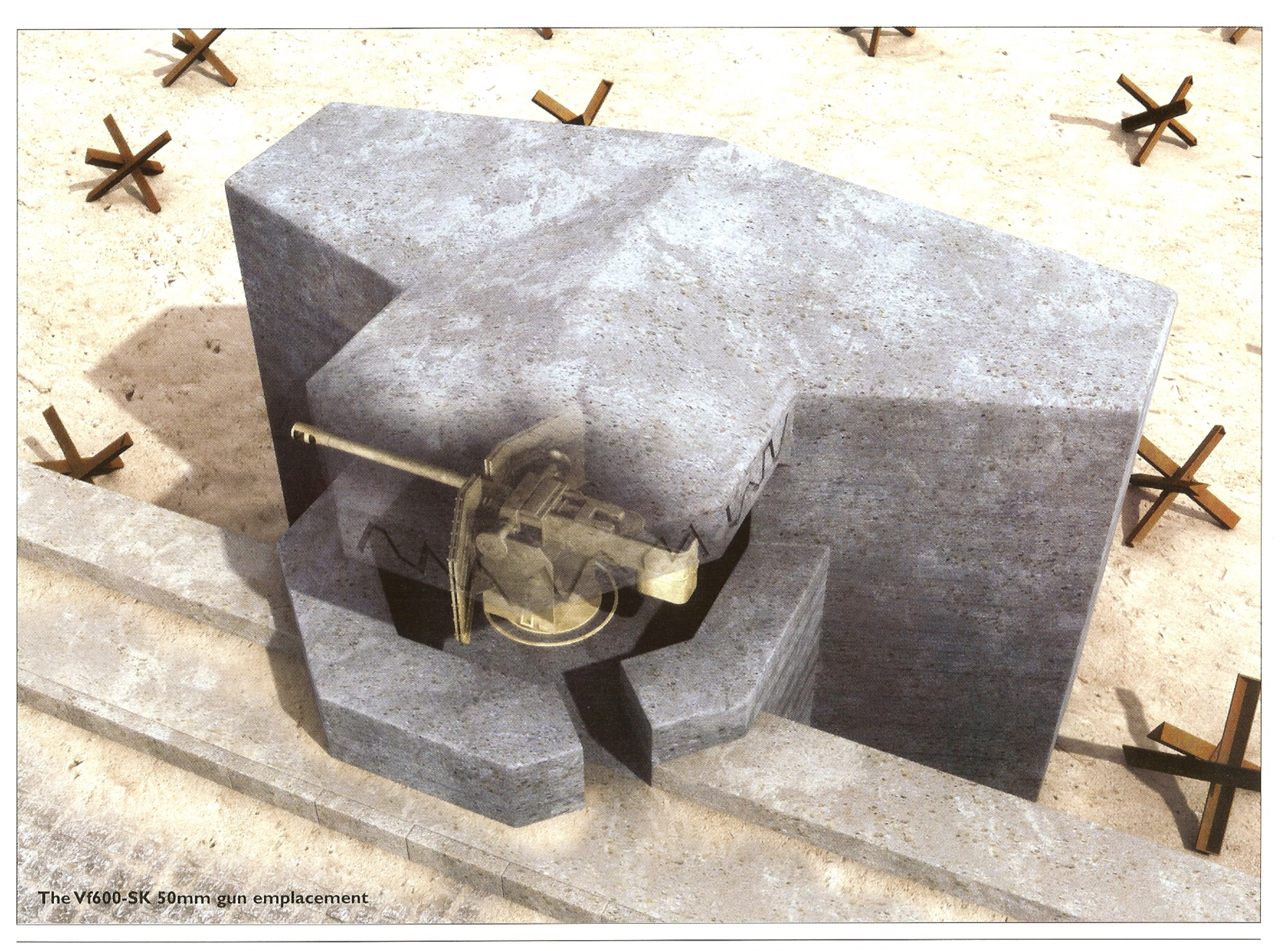
Tobruks were the most common type of fortified position along the Normandy coast, and existed in a wide range of styles. More officially termed "*Ringstanden*," they were all characterized by a single circular opening for a weapon. There were two basic types, the Vf58c and Vf58d, which differed in construction details. The tobruks were most commonly used as machine-gun pits, armed with a wide variety of machine-gun types. The machine-gun tobruk seen in the background here is armed with an MG34. Another very common type, the Vf61a, was designed for 50mm mortars, and had a small concrete platform in the center for supporting the mortar. Generally tobruks offered a small shelter behind the ring opening to provide cover for the crew during bombardment. Access was through a door in the side or rear of the structure. Since the tobruks were only protected to Class B1 standards (1.5m or less) they were generally constructed flush to the ground so that the earth formed an additional layer of protection. In this configuration, they presented a very difficult target for Allied troops, as they were not easily visible and could only be knocked out by a direct hit. In some cases, tobruks were mounted along the seawall immediately along the water's edge. In these cases, the preferred solution was to construct thicker walls than the Class B1 standards, though there were many cases where the lesser standards were followed for the sake of economy.

One version of the tobruk commonly seen on the Normandy beaches was the *Panzerstellung*, equipped with a tank turret. These were sometimes based on the standard Vf67v tobruk as seen here, but also on modified types including a common but non-standard U-shaped tobruk. These usually used turrets from captured French tanks and the two most common types in Normandy were the World War I Renault FT tank turrets and the later APX-R turret as seen here. The APX-R turret was developed by the Atelier de Puteaux in 1935 for the Renault firm, hence the APX-R designation. It was initially used on the Renault R-35 infantry tank, though it was later used on the Hotchkiss H-35 and H-39 cavalry tank as well. It was gradually upgraded with better visors switching from the initial binocular "*fente Estienne*" to the improved PPLRX-180P armored periscope in the APX-R1 turret as seen here, which had a wide field of view. There were three production/armament configurations of this turret, the L.713 with the initial 37mm S.A. 18, the L.739 turret with the slightly improved 37mm S.A. 18 M.37, and the L.767 with the new long-barreled 37mm S.A. 38. However, the latter weapon was usually reserved for Renault and Hotchkiss tanks used by the Wehrmacht for anti-partisan fighting while the two earlier types of turret with the short S.A.18 were used on the tobruks as seen here. These turrets also had a coaxial machine gun, generally the 7.5mm Modele 31. In some cases, the Wehrmacht modified the turret by cutting open the observation dome at the top and installing a split hatch in its place. Both the unmodified and modified turrets could be seen on the tobruks in Normandy, and this one is the unmodified French configuration.

The turret was manned by a single gunner and in the original tank version, a leather strap seat was suspended from the turret ring. In some cases this was removed and the gunner simply stood. The standard Wehrmacht practice was to man these tobruks with at least two soldiers, the second of whom assisted the gunner by providing ammunition. There was no formal ammunition stowage in these bunkers; the ammunition was usually stored in its shipping containers, which in the case of French 37mm ammunition was a simple wooden box. There was an access hatch in the back of the turret, but access into the tobruk was usually through the bunker door.



The tobruk *Panzerstellung*



The Vf600-SK 50mm gun emplacement

(PREVIOUS PAGE)

The Vf600-SK 50mm gun emplacement

One of the most common gun emplacements along the Normandy coast was the open gun platform for the 50mm pedestal-mounted gun. This type was variously called the OB 600 (*Offene Bettung* = open platform) or Vf600 (*Verstarkfeldmässig* = reinforced field position).

In its basic Vf600v form, it was an octagonal concrete gun pit about 4.15m wide generally with recesses for ammunition stowage in the four front and side walls. The basic Vf600 version of the series had two access ways at the rear of the platform while the modified Vf600e (E = *ein*, single) with a single access way as seen in this case.

This basic configuration was modified on numerous occasions to adapt the platform to local conditions, sometimes called SK designs (*Sonderkonstruktion* = special design). One of the modifications notable on the D-Day beaches was this parapet style, which was designed to provide enfilade fire along the beach by exploiting the existing high seawalls. This particular type was seen in the British/Canadian sector of the D-Day beaches, especially on Juno Beach. It was found in modified form elsewhere along the Atlantic Wall in northern France and on the Breton coast. The standard Vf600e design formed the core of the position, but a massive 3.5m-thick glacis was added in the direction of the sea to provide very durable protection against naval gunfire. A ferro-concrete roof was also added over the platform, a feature not found in the standard platform. A crude type of camouflage was created along the lip of the roof by placing wood planks inside the outer edge of the mold when pouring the concrete, resulting in zig-zag indentations to break up the regular shape of the surface. This type of improvised camouflage was widely used in bunker construction in Normandy, though its effectiveness was dubious.

The position was designed as a parapet to stick out beyond the seawall to permit the gun to fire along the wall against any troops trying to seek shelter. However, some of these platforms were constructed on the corners of seawalls, offering even broader fields of fire against the beaches. This type of gun platform caused numerous casualties on D-Day and proved very difficult to knock out from the seaward side. Infantry or tank assaults from the more vulnerable landward side eventually overcame most of these bunkers.

guns. Even fully enclosed bunkers were vulnerable to naval gunfire around their unprotected gun embrasure, so these enfilade-fire casemates oriented the embrasure perpendicular to the shoreline and shielded it using a reinforced wall facing the sea. The most powerful of these was the H677 bunkers armed with the 88mm PaK 43/41. Due to the considerable range of the 88mm gun, a single bunker of this type would be used to cover 3km or more of coastline. In the case of Omaha Beach, there were two H677 bunkers at the eastern and western end of the beach that could cover the entire 7km of beach between them. Besides the 88mm enfilade-fire bunkers, there were similar designs: the small H667 armed with the 50mm gun and the H612, similar in size to the 88mm bunker but intended to house 75mm guns.

Besides the fighting bunkers, there were a variety of other defensive bunkers in the strongpoints. Typically, each strongpoint would have two or three personnel and command bunkers. There was generally not enough space in these bunkers to house the entire strongpoint garrison, but rather they were used for sleeping by a portion of the platoon or company while on watch duty. For example, on Omaha Beach, there were enough personnel bunkers for about 50–60 percent of the garrison. So at WN62, there was a single 20-man bunker for the usual alert group, but when fully manned the strongpoint had over 30 troops. The situation was somewhat different on the British beaches that had towns on the shoreline. In the case of strongpoints built in the towns, the troops were usually garrisoned in houses near the beach, some of which were reinforced with fighting positions. Bunkers were also constructed to store munitions and supplies. There was generally a single command bunker in each strongpoint, sometimes supported by a dedicated observation bunker for associated artillery forward observers with a communication bunker to connect with higher headquarters.

The strongpoints were usually ringed with barbed-wire obstructions and sometimes with minefields. Within the strongpoints, networks of communication trenches and firing pits supported the bunkers.

Priority for bunker construction went to the coastal strongpoints. A smaller number of additional strongpoints were created a short distance inland, but generally the D-Day fortifications lacked any true defense-in-depth. Most inland strongpoints were intended to cover important access routes off the

beach. In addition, some strongpoints were created inland to serve as battalion or regimental headquarters, for example the "Hillman" complex (WN17) near Colleville, which served as the headquarters for Grenadier Regiment 736 and which was located in the Sword Beach sector.

Coastal artillery fortifications

Besides the infantry strongpoints, the most notable fortifications along the Normandy coast were the army and Kriegsmarine gun batteries. These differed in design and layout due to the different tactics of the two services.

The Kreigsmarine's tactical doctrine focused on fighting enemy warships and they used the same weapons as German warships, typically 105mm–152mm destroyer guns. The Kriegsmarine would have preferred to mount their guns in fully armored turrets with 360-degree traverse but armor plate shortages forced them to use partially armored mountings in concrete casemates with limited traverse. These were deployed immediately along the shoreline in direct visual range of enemy ships. The Kriegsmarine batteries depended on a fire-direction bunker near the shore that mimicked a warship's fire controls. They contained optical rangefinders for determining the range to the target, and target-tracking devices to permit the battery to engage a moving target such as an enemy warship. The army batteries also used observation bunkers for their batteries, but without the elaborate fire-direction equipment. The army derided the navy batteries' positions as "battleships of the dunes," arguing that their proximity to the shore made them especially vulnerable to Allied naval bombardment. In return, the naval artillery officers thought that their army counterparts were clueless about the technical and tactical difficulties of engaging moving enemy warships with their crude fire-control equipment. On D-Day, it was the naval batteries that proved the more effective.

The Kriegsmarine also deployed fortified radar positions along the coast for naval surveillance. These surveillance radars served as the first line of the navy's defense of the coast, passing target information to nearby gun batteries. For example, 2.Funkmessabteilung deployed two surface-search radars in strongpoint StP 42 on the Arromanche plateau between Omaha and Gold Beaches.

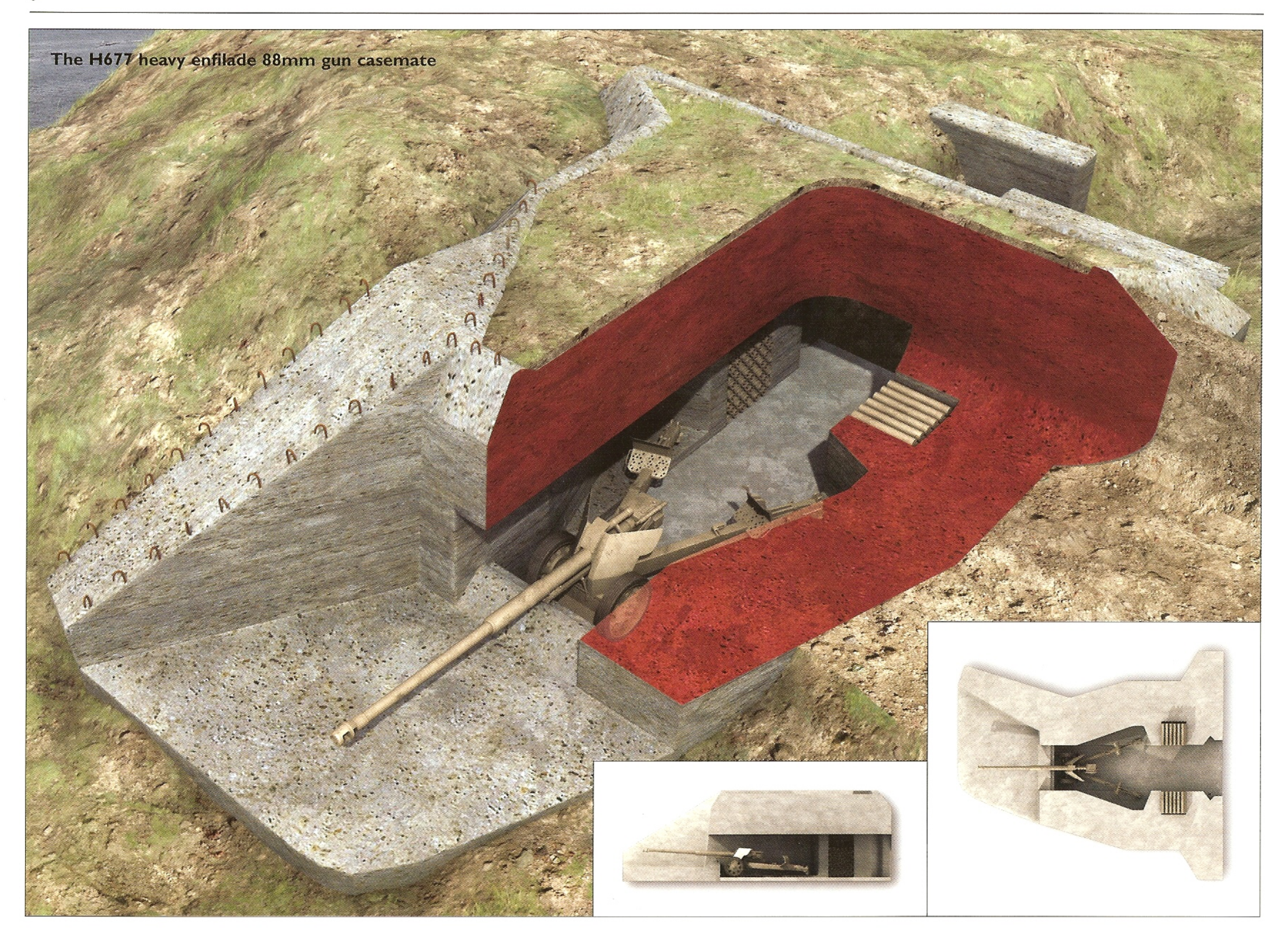
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The H677 heavy enfilade 88mm gun casemate

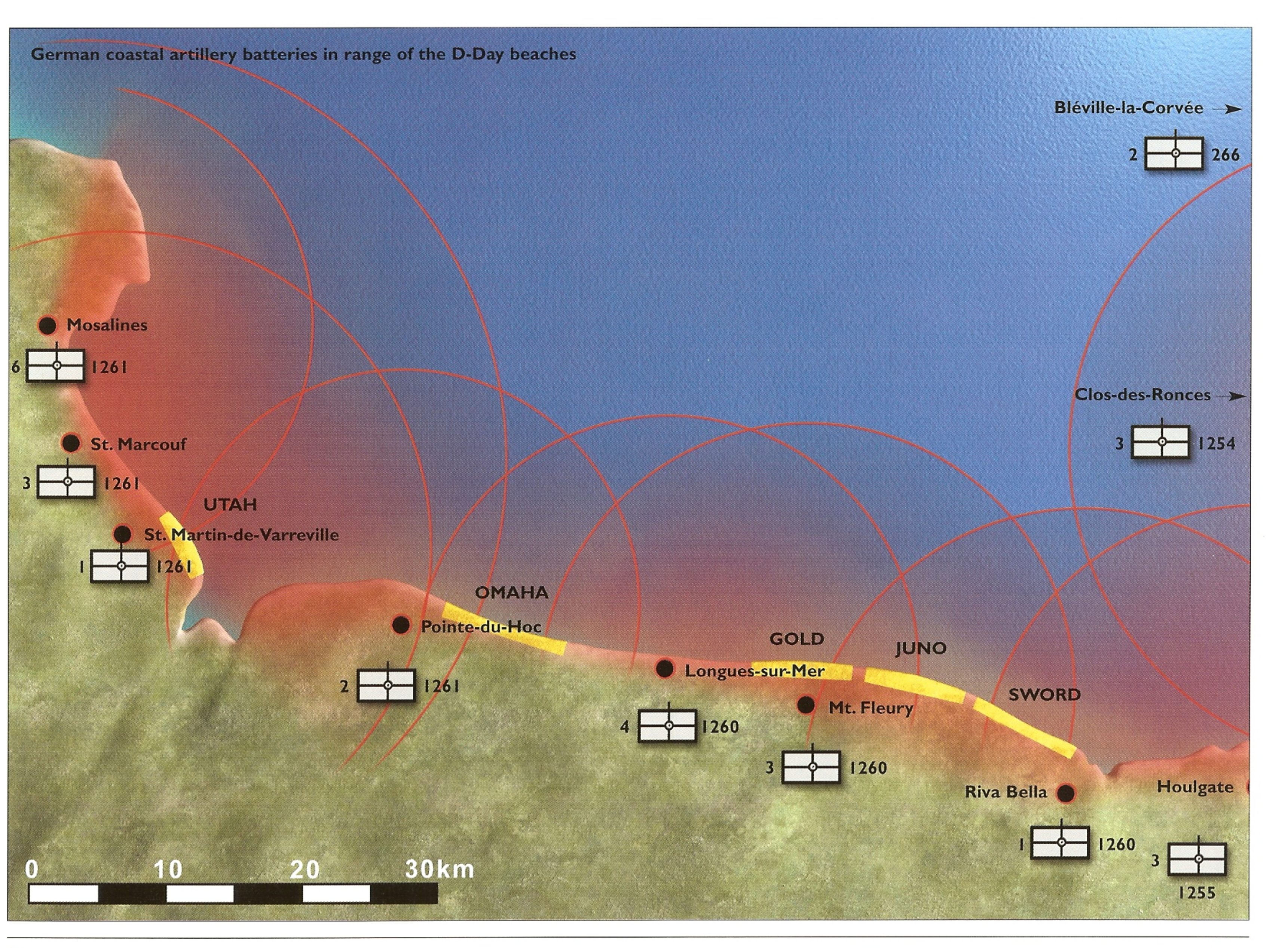
One of the most fearsome types of defensive emplacements on the D-Day beaches was the H677 gun casemate, armed with the massive 88mm PaK 43/41 towed anti-tank gun. This type of casemate was officially designated as "*Schartenstand für 8.8cm PaK 43/41 ohne Nebenräume*" and the first of this type was completed in March 1943. This type of bunker was designed for enfilade fire with a 2m-thick wall protecting its embrasure from the sea. The powerful gun in this bunker could control the beach for 2–3km, so at Omaha Beach there was one of these on either end of the beach; other beaches typically had a single example of this type of heavy bunker.

Construction of this bunker was typical of the gun casemates found along the Normandy coast, basically a garage design with a large armored access door in the rear and a large embrasure in the front to permit a wide field of fire of almost 60 degrees. The protective basis was Category B, meaning 2m-thick concrete that offered protection from most army artillery and naval guns up to about 8in. cruiser weapons. These bunkers were essentially impervious to tank guns, except for the front embrasure and the rear armored door. There was a concrete apron in front of the gun embrasure, partly to prevent dirt and dust being kicked up when the gun fired and thereby obscuring subsequent firing, but also to minimize the risk of enemy artillery kicking up earth immediately in front of the embrasure from near misses. The bunker was designed to be enclosed with earth on both sides, while at the rear of the bunker, an earthen berm or protective concrete wall was erected to shield the rear armored door. Generally, the roof was covered with earth for camouflage purposes. The upper edge of the bunker had curved sections of rebar protruding that were used to attach camouflage nets. Generally, a camouflage net was extended over the front of the structure to hide the embrasure. In some cases, the exposed concrete was camouflage painted. This was not a standardized procedure and depended largely on the local unit.

The construction of one of these bunkers required the excavation of about 150 cubic meters of soil and consumed 380 cubic meters of concrete, 17 tonnes of steel rebar and 4.5 tonnes of other steel. A total of 146 examples of this type of bunker were constructed on the Atlantic Wall, mainly in early 1944, with 55 of these in the Seventh Army sector in lower Normandy.



The H677 heavy enfilade 88mm gun casemate



German coastal artillery batteries in range of the D-Day beaches
Bléville-la-Corvée →
2
266
Mosalines
6
1261
St. Marcouf
3
1261
UTAH
St. Martin-de-Varreville
1
1261
Clos-des-Ronces →
3
1254
OMAHA
Pointe-du-Hoc
2
1261
GOLD
JUNO
Longues-sur-Mer
Mt. Fleury
SWORD
4
1260
3
1260
Riva Bella
Houlgate
1
1260
3
1255
0
10
20
30km

(PREVIOUS PAGE)

German coastal artillery batteries in range of the D-Day beaches

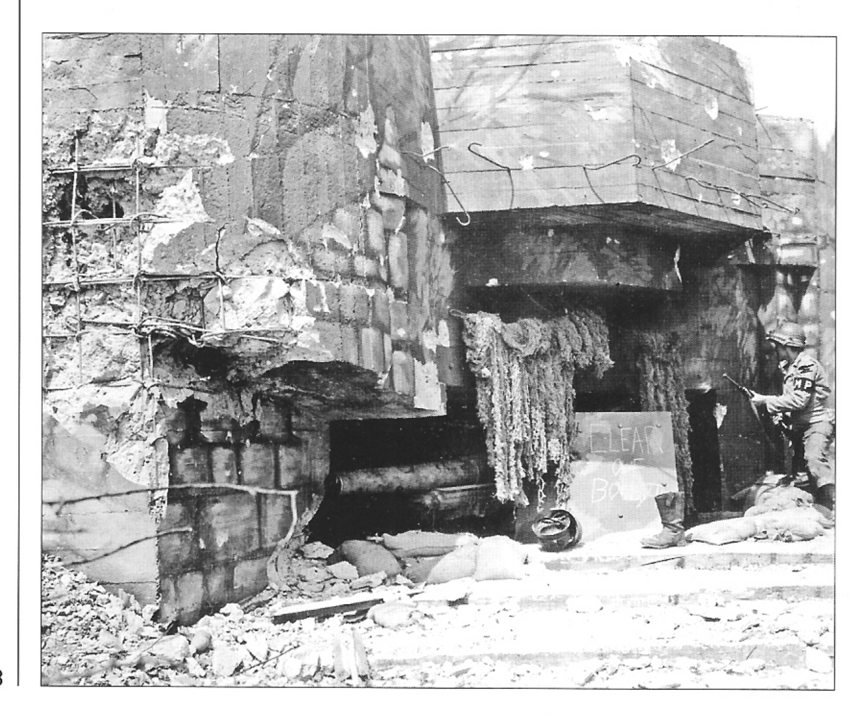
The coastal artillery along the Normandy coast was designed to provide interlocking fire. It should be noted that the only batteries illustrated here are the army and navy coastal artillery batteries in range of the D-Day beaches. There were additional coastal batteries on the Contentin coast northwest of Utah Beach, but not within range. The army's divisional artillery batteries are not shown here for clarity.

Nearly all of the batteries shown here were under army control, including two batteries that had been constructed and manned by the Kriegsmarine at Saint Marcouf/Crisbeq and Longues-sur-Mer. The exception was 2/MAA.266 near Bléville-la-Corvée with its massive turreted 380mm gun from the cruiser *Jean-Bart*. Three of these guns were planned but only one was complete by D-Day. Although this gun could reach the D-Day staging areas and the beaches themselves, in reality the lack of fire control beyond the horizon limited its utility at such extreme ranges. The same was true of the 3/HKAA.1254 battery of three 170mm K18 guns at Clos-des-Ronces, which were at the fringe of the D-Day beach staging areas.

The most powerful of the batteries to the west was 3/HKAA.1261 in Crisbeq near Saint Marcouf, with four casemated Skoda 210mm K39/40 guns, two of which were in H683 casemates. This battery engaged in a duel with Allied destroyers off Utah Beach. Within the more immediate area of the beaches, several of the batteries had taken such a pounding during the preliminary air and naval bombardments that their guns had been pulled back days before including the batteries at Riva Bella and Pointe-du-Hoc. 1/HKAA.1261 at St. Martin-de-Varreville had four 122mm guns in open positions and was heavily shelled by HMS *Hawkins* on D-Day so never went into action. It was taken later in the day by troops of the 101st Airborne Division. The batteries that did engage Allied ships on D-Day included the Longues-sur-Mer battery between Omaha and Gold Beaches (covered in detail below), and the Houlgate battery of 3/HKAA.1255, which was armed with three 155mm K420(f) guns. The Houlgate battery was initially silenced by fire from HMS *Ramilles*, but the battery subsequently engaged HMS *Warspite* and was again brought under heavy naval fire.

Another key difference between the army and navy was in the type of weapons. The army doctrine preferred the use of mobile guns so that weapons could be moved from an inactive sector to another combat zone if necessary. As a result, the army batteries typically used conventional towed artillery and the casemates were designed to permit their easy removal. In the heaviest calibers, the army used railroad guns though there were no railroad guns in range of the D-Day beaches. In contrast, the navy preferred to use fixed naval guns. A good example of the navy pattern of coastal artillery was the Longues-sur-Mer complex between Omaha and Gold Beaches, while a good example of an army battery was the Pointe-du-Hoc battery between Utah and Omaha Beaches.

The Longues-sur-Mer battery was designated as WN48 and was initially part of MAA.260 (*Marine-artillerie-abteilung*: navy artillery battalion) headquartered in Cherbourg. Since it was so distant from the rest of its unit, the battery was later subordinated to the army's HKAA.1260. The battery consisted of four 150mm guns in M272 casemates and a fire-control center located in an M262 casemate on the cliffs near the shore. Further details of this battery will be found in the notes accompanying the artwork on pages 36–37.



To the northwest of Utah Beach was the Azeville battery of 2/HKAA.1261, which included this H650 gun casemate with 105mm K331(f) gun. As can be seen, the casemate withstood a serious pounding by Allied naval gunfire. (NARA)

Artillery defenses in the vicinity of D-Day beaches June 6, 1944

Unit	Strongpoint	Location	Weapons	Fortification
3/HKAA.1261		Saint Marcouf	4 x 210mm K39/40	H683 (2 incomplete) + M272
2/HKAA.1261	StP 133	Azeville	4 x 105mm K331(f)	H650, H671
II/AA.191		Brecourt	4 x 105mm IFH 18/40	field entrenchment
1/HKAA.1261	WN108	St. Martin de Varreville	4 x 122mm K390/2(r)	H669
8/AR.1716	WN84	Maisy-la-Martinière	4 x 100mm IFH 14/19(t)	H669
9/AR.1716	WN83	Maisy-la-Perruque	6 x 155mm sFH414 (f)	open platform
2/HKAA.1260	WN76	Pointe-du-Hoc	4 x 155mm K420(f)	H679 (incomplete) + H636a command post
2/AR.352		Formigny	4 x 105mm IFH 18/40	field entrenchment
3/AR.352		Colleville	4 x 105mm IFH 18/40	field entrenchment
1/AR.352		Houteville	4 x 105mm IFH 18/40	field entrenchment
Nebel.Abt.84	WN67	St. Laurent-sur-Mer	40 x 320mm *Nebelwerfer*	23 field entrenchments
6/AR.352		Vaux-sur-Aure	4 x 105mm IFH 18/40	field entrenchment
5/AR.352		Ferme Tringale	4 x 105mm IFH 18/40	field entrenchment
4/AR.352		Lieu-dit-Pierre	4 x 105mm IFH 18/40	field entrenchment
4/HKAA.1260	WN48	Longues-sur-Mer	4 x 150mm TbtsK C/36	M272 + M262a fire control
3/HKAA.1260	WN35a	Mont Fleury	4 x 122mm K390/1(r)	H679 (incomplete)
5/AR.1716	WN35b	Hable de Heurlot	4 x 100mm IFH 14/19(t)	H669 (incomplete)
3/sAA.989		Creully	4 122mm sFH 386 (r)	field entrenchment
2/sAA.989		Amblie	4 122mm sFH 386 (r)	field entrenchment
1/sAA.989		Basly	4 122mm sFH 386 (r)	field entrenchment
6/AR.1716	WN32	Ver-sur-Mer	4 x 100mm IFH 14/19(t)	H669
7/AR.1716	WN28a	Beny-sur-Mer	4 x 100mm IFH 14/19(t)	field entrenchment
1/HKAA.1260	StP Caen 08	Riva Bella	6 x 155mm K420(f)	H679 (incomplete)
2/AR.1716	WN16	Colleville	4 x 100mm IFH 14/19(t)	H669
3/AR.1716		Bréville	4 x 75mm FK 16 nA	field entrenchments
4/AR.1716	WN12	Ouistreham	4 x 155mm FH414 (f)	H607
1/AR.1716	WN01	Merville	4 x 100mm IFH 14/19(t)	H669 + H611 command post
3/HKAA.1255	StP Vill 033	Houlgate	6 x 155mm K420(f)	H679 (two)
2/HKAA.1255	WN Vill 013	Mount Canisy	6 x 155mm K420(f)	H679 (three complete) + H501
4/HKAA.1255	WN Trou 032	Trouville/Hennequeville	4 x 105mm K331(f)	H671
1/HKAA 1255	WN Trou 012	Villerville/Bruyères	6 x 155mm K420(f)	H679 (one complete) + H501

Notes:
IFH: light field howitzer sFH: heavy field howitzer TbtsK: destroyer gun

The Pointe-du-Hoc battery is another well-known site since its commanding position on a promontory with clear fields of fire toward both Utah and Omaha Beaches forced the US Army to launch a risky operation by the 2nd Ranger Battalion to capture the guns. The site was occupied by the 2nd Battery of Army Coastal Artillery Regiment 1260 (2/HKAA.1260) equipped with six French GPF 155mm K418(f) guns. When originally constructed in 1943, the site had six open concrete gun pits, but in 1944 it was being reconstructed to protect each gun with a fully enclosed H671 casemate. By June 1944, four of six casemates for the guns had been completed, along with an H636 observation bunker and L409a mounts for 20mm Flak 30 anti-aircraft cannon. Heavy Allied bombing raids were so destructive that the guns were withdrawn inland and were not present on D-Day.

Besides the coastal gun batteries in the immediate vicinity of the D-Day beaches, there were two other large concentrations of coastal artillery positions east and west of the landings sites. The Azeville, Crisbeq, Morsalines and Pernelle batteries were within range of Utah Beach to the northwest. There was a large concentration of batteries defending the in the Le Havre area, but most were not in range of Sword Beach, though they could threaten naval traffic wandering to the east.

In addition to the dedicated navy and army coastal defense batteries, there were also many army artillery positions along the D-Day beaches,



The M262a fire-control bunker of the Longues-sur-Mer battery was the most modern on the Normandy beaches, the only one with an automated plotting and electric data distribution system. (Gary Edmundson)

including both divisional artillery units and some 84th Corps artillery units. Much of the 716th Infantry Division's artillery regiment, AR.1716, was in the process of being fortified in the spring of 1944, but this was not complete. These batteries were concentrated on the eastern side of the D-Day beaches, especially in the Sword Beach area. The other major German formation near the D-Day beaches, the 352nd Infantry Division, was a more recent arrival and all of its field artillery regiment, AR.352, was in conventional open field entrenchments a few kilometers behind the beach. A significant firepower enhancement in the Omaha Beach area was added on May 9, 1944, when a battery of heavy artillery rockets (*Nebelwerfer*) of Werfer-Regiment 84 was positioned near St. Laurent-sur-Mer in open entrenchments overlooking Omaha Beach. In spite of the number of artillery weapons in Normandy, there was a significant problem with supply caused by their wide variety and different calibers. The Seventh Army had 92 different types of artillery, many of foreign manufacture. The Wehrmacht renamed foreign artillery in their service and this can be identified by the suffix, so for example the 122mm K390/2 (r) is the Soviet 122mm gun, and the other common suffixes were French (f); Czech (t); and Belgian (b).

Other fortifications

Besides the coastal artillery and infantry fortifications along the D-Day beaches, there were a number of other fortified sites including Kriegsmarine and Luftwaffe radar sites. One of the most significant of these was located near Douvres, behind Juno Beach. Codenamed Distelfink (Goldfinch), this was the radar complex of 8/Signals Regiment 53 and was based around five large radars in two neighboring strongpoints. It served as a fighter-command station directing Luftwaffe fighters against Allied aircraft, and had a radio control center with Seeburg plotting tables in a large L486 bunker, and the Anton fighter direction center in a two-story L479 bunker. By the time of the D-Day landings, all of the radars had been knocked out by air strikes, but Douvres would later become the center of some of the most prolonged resistance along the Normandy beaches.

The living site

With the exception of the coastal artillery units, the Normandy fortifications were manned by regular infantry units and not by specialized fortification troops. Until March 1944, most of the D-Day beach area was the responsibility of the 716th Infantry Division stationed from the Orne Estuary northeast of Caen to the Vire River near Carentan. To the west in the Utah Beach sector was the 709th Infantry Division, which guarded the coast along the Contentin Peninsula toward Cherbourg.

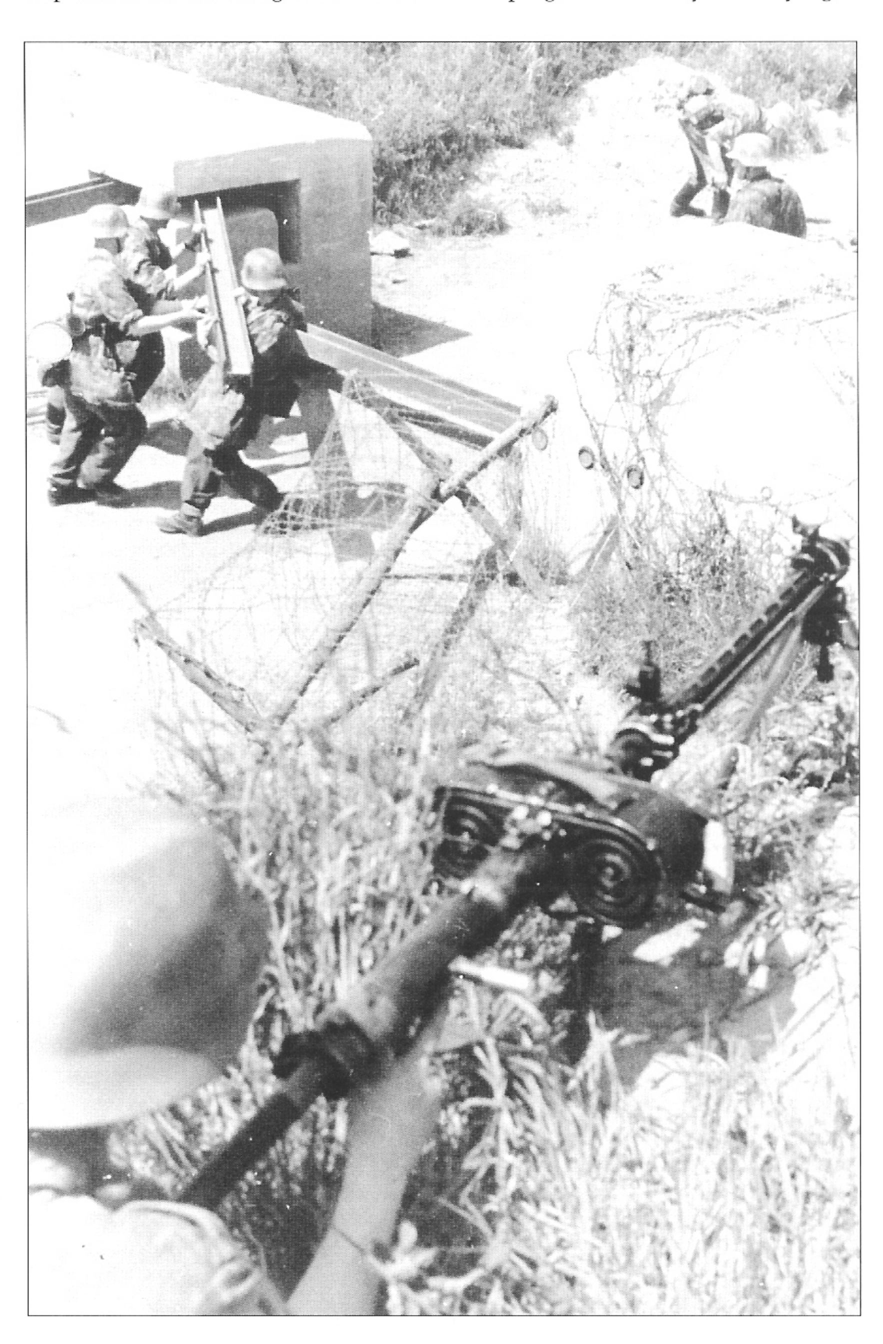
Both of these units were "static" divisions – second-class units not well enough equipped to conduct normal offensive infantry operations. This type of division was equipped with second-rate weapons, often captured foreign types, and lacked vehicles and other support equipment. The troops in static divisions tended to be older conscripts, averaging 35 years old. They included veterans who had been wounded seriously enough that they could not return to normal infantry divisions, and also troops suffering from the debilitating effects of frostbite suffered on the Eastern Front. There were some younger conscripts in these units, often with medical problems. To make matters worse, during 1943 the Normandy divisions were continually "combed out" for troops suitable for deployment to Russia. In their place, the divisions received Ost battalions made up of former Soviet prisoners of war. These "volunteers" were often coerced into joining these units, or volunteered rather than starve to death in the brutal German POW camps. As a result, their reliability in combat was far from certain.

On March 15, 1944, the 352nd Infantry Division was ordered to take over defense of the Bayeux sector of the Normandy beaches as part of Rommel's effort to strengthen the defenses in this sector, particularly the Grandcamp sector (Omaha Beach). This newly created division was organized as a Type 44 infantry division, and most of its personnel were recent conscripts 18 to 19 years old. Unlike the two other divisions, it was a full-strength division, sometimes called an "assault" division as opposed to a "static" division as it was capable of offensive operations. The division was deployed from the Vire River to Bayeux. It did not displace the two battalions from GR.726 of the 716th Infantry Division already manning the strongpoints along Omaha Beach. Instead, these companies were put under control of the 352nd Infantry Division.

The 352nd Infantry Division was responsible for defending 53km of coastline, far beyond the standard 6 to 10km frontline that was considered prudent in German tactical doctrine. This led to a number of arguments between Rommel and the divisional commander, Gen. Lt. Dietrich Kraiss. Rommel wanted all of the infantry companies along the main line of resistance so that they could fire on invading Allied troops. Kraiss wanted to use more conventional elastic defense tactics with a relatively thin screen along the beach and most of the companies held in reserve well behind the bluffs so they could counterattack any penetrations. In the end, a compromise was reached. In the Omaha Beach sector, one of its infantry battalions moved up to the coastline and deployed two of its companies in the forward defenses alongside GR.726, and the other companies in the villages a few kilometres from the beach. As a result, there was no firm delineation between the troops of the two divisions in the strongpoints along Omaha Beach. For example, strongpoint WN62 had a garrison of 31 troops, including 21 from 3/GR.726 of the 716th Infantry Division, an artillery observation team of seven troops of AR.352 of the 352nd Infantry Division, and seven infantrymen from GR.916 of the 352nd Infantry Division. Allied

intelligence thought the division was still in corps reserve back around St. Lô. This intelligence failure would come as a painful surprise at Omaha Beach.

Life along the Normandy coast for the Wehrmacht troops was not markedly different from occupation duty elsewhere in France. Memoirs by German veterans recall their relief at being in France instead of Russia. Relations with the neighboring French were proper and, depending on the commanders' attitudes, sometimes friendly. The garrisons along the coast purchased food and milk from local French farmers and German veterans recall flirting with the local farm girls. Aside from the usual military chores of calisthenics and daily tactical training, a portion of the troops at any one time were generally assigned to an alert unit positioned along the beach. These alert units were responsible for manning the defenses and keeping a watchful eye for any signs



A German infantry squad takes part in invasion drills prior to D-Day. The troops in the background are installing steel beams used to block the roadway from tanks while they are overwatched by a machine gunner armed with an MG15. (MHI)

of Allied forces, especially Commando raiding parties. In general, there were few beach patrols during the daylight hours since the beach could be observed from the defensive positions. Instead, patrols were conducted continuously through the hours of darkness to prevent Commando raids. In the case of some beach areas, the houses and buildings immediately along the coast were taken over by the Wehrmacht in 1942–43. Alert units used some of these. As the beach defenses improved, the alert units were garrisoned in the strongpoints in special bunkers. A typical personnel bunker of the type common in Normandy had berths for 20 troops in cramped conditions. Generally the alert units used canteens that had already been established in French buildings along the coast. Troops not on alert duty were generally garrisoned in the neighboring towns and villages further away from the coast.



German troops run for cover as a US Army Air Force P-38 reconnaissance aircraft makes a low photographic pass over the Normandy beaches on May 6, 1944. The troops appear to be working on new *Hemmbalk* obstructions to reinforce the weaker wooden stakes seen to the right. (NARA)

On January 29–30, 1944, Rommel paid his first visit to the 716th Infantry Division. He was not pleased with what he found, and complained to the divisional commander about the lack of preparation after three years of occupation duty. In the wake of Rommel's visit, the troops were obliged to spend a great deal of their time on beach obstacle work. Work teams were sent to the neighboring Cerisy Forest to cut down trees to make beach stakes. As a result, tactical training of the troops suffered, and the divisional officers complained to higher headquarters. These complaints were ignored and construction work continued through the spring. Rommel was tireless in his efforts to improve the beach defenses and returned to this area on March 6–7, again on May 18, and finally on May 30 to make certain that his orders were being carried out.

On the eve of D-Day, the state of the defenses on the five beaches varied considerably. Without a doubt, the most formidable defenses were on Omaha Beach in terms of the terrain, the number of strongpoints and the number and quality of German troops present in the immediate vicinity of the beach. Some idea of the differences can be determined from the accompanying chart.

Density of defenses on D-Day beaches*

	Width (km)	Strongpoints	WN per km	German Inf. Co.	MG	Mortars	Field guns	AT guns	Allied D-Day casualties
Utah	2.0	3	1.5	1	17	3	7	6	197
Omaha	7.2	10	1.4	8	85	28	20	15	2,374
Gold	5.5	4	0.7	4	18	1	5	9	413
Juno	6.0	4	0.67	4	33	5	4	9	805
Sword	3.2	2	0.62	2	14	7	8	7	630

* Sources: *Comparison of British and American Areas in Normandy in terms of Fire Support and its Effects*, (British Army Operational Research Group Report No. 292, August 1945); *Report on German Concrete Fortifications (in Normandy)*, Office of Chief Engineer, HQ, ETO-USA, October 1944.

The site in war

Pre-invasion attacks

The battle for the Normandy beaches began weeks before D-Day with repeated Allied air attacks along the whole French coast. There was a limit to the intensity of the Allied attack on the D-Day beaches for fear of tipping off the Germans as to the precise location of the attack. The large coastal gun batteries and major radar stations were singled out for special attention. The first to be hit heavily was the naval gun battery at Saint Marcouf, followed by the batteries of the HKAA.1261 at Decosville, Morsalines, Gatteville, Pernelle and St. Martin-de-Varreville. Many of these sites were bombed several times. Although the concrete casemates in most cases remained intact except for cracks, several of the batteries, including the 1st, 6th and 10th Batteries of HKAA.1261, had been so thoroughly bombed that the guns had to be moved. In the case of the 2/HKAA.1260 on Pointe-du-Hoc, the guns were removed from the area and hidden along a tree line several kilometers behind the beach. The large Luftwaffe radar base at Douvres had all of its radars demolished in May 1944. In spite of the success of some of these attacks, many other sites remained operational, for example the battery at Longues-sur-Mer.

Although Allied planners knew of the locations of virtually every major German fortification along the Normandy coast, they did not know the actual function or armament in all cases. In particular, there were several misperceptions about the type and potency of the coastal artillery batteries. The Merville battery was singled out for special attention by British paratroopers due to the concern that it was a large-caliber naval coastal battery, when in fact it was only a casemated divisional field gun battery. Longues-sur-Mer, which was a very sophisticated naval gun battery, did not receive the same degree of attention and was to be suppressed by naval gunfire rather than direct attack by Special Forces. Allied planners were aware of the locations of the many heavy enfilade gun batteries along the beaches, but did not fully appreciate the threat these batteries posed to the landing forces.

The major coastal batteries were subjected to another round of bombing in the early hours of D-Day. Three on the Contentin Peninsula at Saint-Marcouf/Crisbeq, Fontenay and St. Martin-de-Varreville were hit around midnight since they were near the landing zones of the US paratroopers and so had to be struck before the paratroopers landed. Seven more at La Pernelle, Maisy, Pointe-du-Hoc, Longues-sur-Mer, Mt. Fleury, Ouistreham and Houlgate were hit between 0315 and 0500hrs by a total of 1,056 RAF bombers dropping about 5,000 tons of bombs for an average of nearly 500 tons per battery. For example, 114 Lancasters bombed the battery at Ouistreham delivering some 580 tons of bombs. However, in an age before guided weapons, these air strikes were of very limited value. For example, the Merville battery had been hit by about 1,000 bombs of which only 50 actually landed within the battery site and only two actually struck one of the gun casemates, in neither case disabling it.

Due to the poor weather on the night of June 5/6, 1944, and forecasts of more poor weather, the German staff in France had declared the chance of invasion that day as "improbable." Nevertheless, the heavy bombardment along the coast in late May had led to the decision to fully man the strongpoints at all times, which included staffs deployed in the command posts on the coast. Even if not expecting the invasion, the German garrison along the coast was ready. The garrisons went to full alert shortly after midnight when word arrived of the paratroop landings.

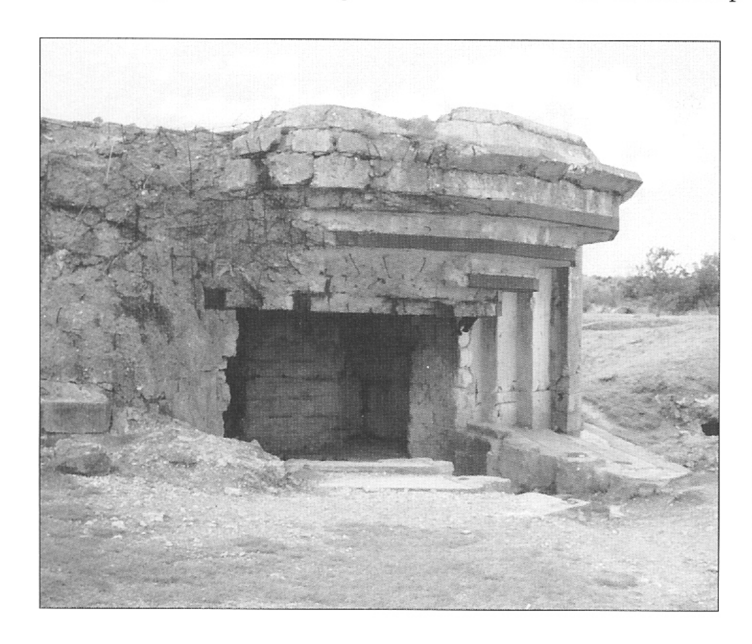
In the limited space available here, it is impossible to recount in detail the fate of the many German fortifications at Normandy so the emphasis will be on some of the more significant examples. Readers seeking more detail are encouraged to read the four volumes in the Osprey Campaign series dealing with D-Day operations.

One of the first fortifications assaulted by Allied troops was the 1st Battery of AR.1716, the divisional artillery of the 716th Infantry Division located in H669 casemates near Merville on the eastern side of the Orne River. Allied planners believed these to be 150mm naval guns, and feared that they would wreak havoc among the assault ships approaching Sword Beach. So the British 5th Parachute Brigade was assigned to deal with this threat. As was typical of airborne operations on D-Day, not all went according to plan and the paras were forced to assault the battery with only a fraction of the intended force. In the event, the attack in the predawn darkness was something of an anticlimax. Flares illuminated the bunkers, and the superbly trained paratroopers swarmed over the site. The battery surrendered quickly, and the guns turned out to be captured World War I field guns, and not modern coastal guns as had been feared.

Another special attack was planned later in the morning at Pointe-du-Hoc to the west of Omaha Beach. This task was assigned to elements of the US 2nd Ranger Battalion, which landed on the cliffs under the battery in the early hours of the morning and climbed the cliffs against determined opposition from the 716th Infantry Division. The battery had been thoroughly smashed by previous air and naval bombardment, and the Rangers fought an intense battle lasting most of the day in the lunar landscape of bomb craters. Although the gun casemates were quickly seized, the guns had been moved days before due to the bombardments, and were found by a Ranger patrol a few kilometers away near a line of trees where they were destroyed. The 2nd Rangers were isolated from the rest of the Allied invasion force for more than a day, gradually overcoming German resistance in the scattered bunkers on the promontory.

Naval gun duels

Some of the first combat actions from the German defenses began around dawn when the coastal batteries began engaging Allied ships. Even after the early-morning air bombardments, Allied warships attacked most of these batteries again. The naval planners had assigned at least one cruiser or battleship per battery.



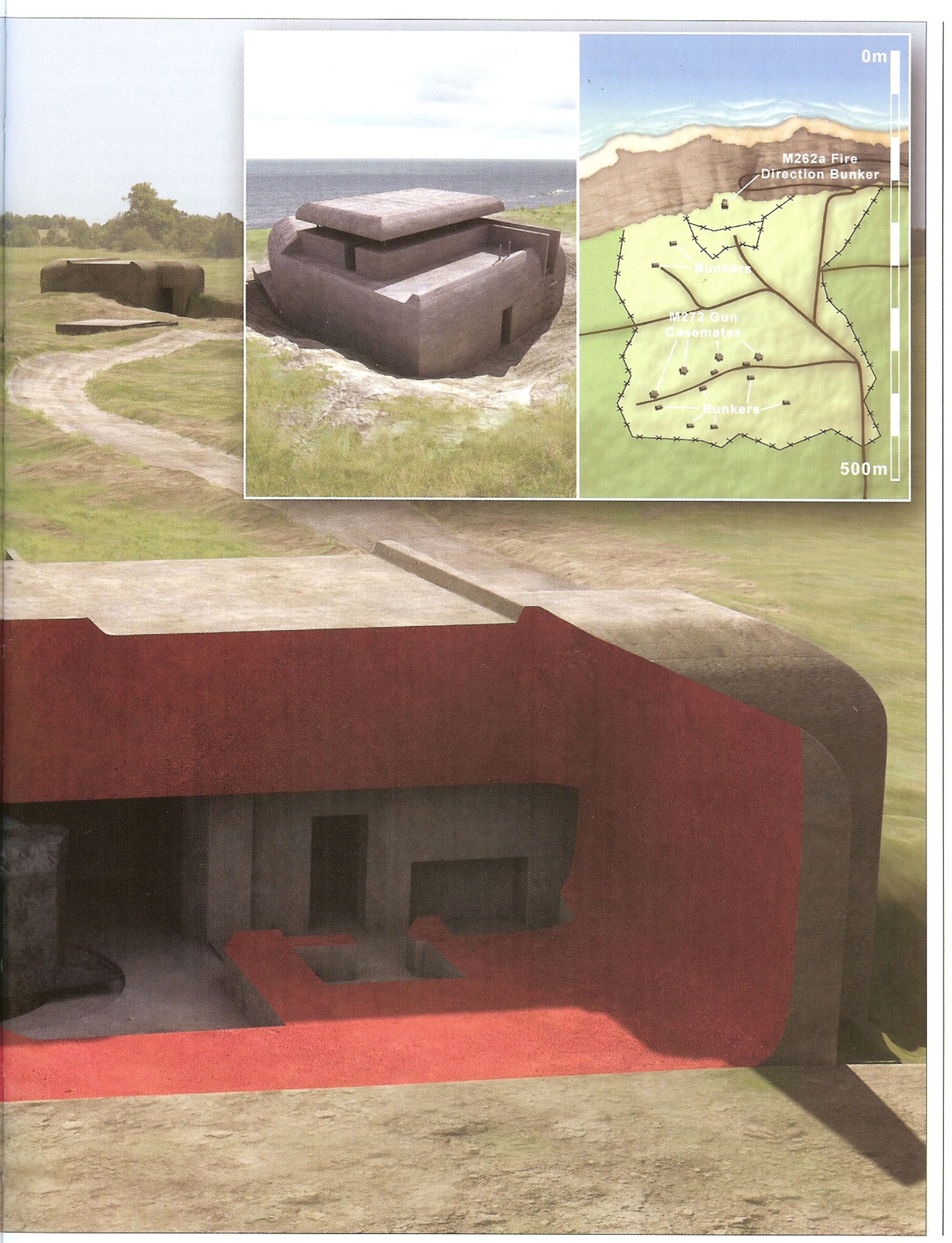
BELOW LEFT The 2/HKAA.1260 battery at Pointe-du-Hoc had been so badly beaten up by air attacks preceding the D-Day landings that the battery removed its four guns to a wooded area a few kilometers behind their intended gun casemates. The extent of the damage is still evident a half-century later in this view of one of the H679 casemates. (Author)



BELOW RIGHT The gun duels between the Longues-sur-Mer battery and British warships left several of the casemates partially obstructed by dirt from nearby shell craters as seen here a few days after D-Day. (NARA)

The Longues-sur-Mer naval coastal gun battery




0m
M262a Fire
Direction Bunker
Bunkers
M272 Gun
Casemates
Bunkers
500m

(PREVIOUS SPREAD)

The Longues-sur-Mer naval coastal gun battery

The Longues-sur-Mer gun battery is illustrative of coastal artillery in Normandy. Construction of the battery began in September 1943 on naval patterns. It was originally part of MAA.260 (Naval Artillery Battalion 260) and was commanded by Oberleutnant MA Kurt Weil. The configuration was typical of navy batteries. An M262a fire-direction bunker was constructed near the cliffs at the forward edge of the battery position to provide clear observation of targets at sea. This bunker had the most modern fire-control system of any of the batteries in this sector. It was electrically powered and fed the aiming data directly from the control bunker to the individual gun casemates. This was a two-story bunker with range-finding and observation equipment, and a target-tracking center located in the lower chamber. It was connected by landlines to the four M272 gun casemates. The four gun casemates were armed with 150mm C/36 single-mount *Torpedoboots Kanone* (destroyer guns), built by Skoda in Pilzen, with a maximum range of 19km (12 miles). There were ammunition rooms behind the gun chamber, one to contain the powder charges and the other to contain the ammunition. The casemate was protected to Class B standards with walls and roof 2m thick and construction consumed 760 cubic meters of concrete. The first casemate of this type was completed in April 1943 and this particular battery was completed in May 1944. There were a total of 27 of the M272 casemates built in 1943–44, with six in the Seventh Army sector in lower Normandy.

The battery was defended by tobruks near the eastern cliff edge and a set of bunkers and trenches on the western edge, which included a searchlight position for night illumination. The perimeter had a barbed-wire fence and there were a series of communication trenches running around the site to permit personnel to move about when the battery was under fire. The battery was provided with several 20mm light Flak automatic cannons for air defense. The battery also had a captured Soviet 122mm K390/1 (r) gun that was used to fire illumination rounds during night engagements. The battery had a garrison of 184 troops, though in June 1944 there were some additional army infantry nearby to help protect the site.

When the OKW decided to streamline command and control of the coastal defenses, the battery was subordinated to the army's HKAA.1260, becoming its fourth battery. The battery was subjected to several bombing attacks in 1944, including two major raids in the week before D-Day, but none of the bunkers were disabled. However, the air attacks did tear up the underground cabling for the fire-direction system, so the battery was obliged to use visual signals for fire direction on D-Day, substantially decreasing its effectiveness against Allied ships. At 0530hrs on D-Day, HMS *Ajax* bombarded the battery without causing major damage, and it began firing on the command ship HMS *Bulolo* around 0600hrs forcing it to move station. HMS *Ajax* returned along with HMS *Argonaut* and began bombarding the battery again, and it ceased fire around 0845hrs after two of its guns were knocked out by direct hits through the open embrasures. The cruisers had fired a total of 179 rounds against the battery. The Longues battery crew cleaned up the position in the late morning, and the remaining two guns opened fire again in the afternoon towards Omaha Beach, prompting the attention of the French cruiser *Georges Leygues*, which was defending the American sector. This final bombardment put the battery out of action for the last time on D-Day after it had fired 115 rounds during the course of the day. The exposed 122mm gun was used to fire at both Gold and Omaha Beaches during the course of the day. Its supporting infantry were called away to Bayeux on June 7, leaving it exposed to ground attack. After the battery was softened up by RAF fighter-bombers on the morning of June 7, it was assaulted by C Company, 2nd Devons, of the British 231st Brigade, and 120 men of its original 184-man garrison surrendered when the battery was captured around 1100hrs.

So for example, the batteries to the east of Sword Beach at Villerville, Bénerville (Mt. Canisy) and Houlgate were bombarded by the battleships HMS *Warspite*, *Ramilles* and *Roberts*. As a result of these preliminary air and naval bombardments, many of the German gun batteries remained inactive for much of D-Day with their crews taking shelter in the personnel bunkers near the guns. This was especially true of the batteries still deployed in open gun pits, which were particularly vulnerable to air and naval bombardment.

In spite of the preliminary bombardments, some of the long-range guns in heavy casemates east of Utah Beach on the Contentin Peninsula began to fire on Task Force U, the naval task force assigned to Utah Beach. The Morsalines battery of 6/HKAA.1261 with six French 155mm guns had been located in concrete emplacements near St. Vaast but, due to air attacks, had moved to open ground near Videcosville. It began firing on a minesweeper, prompting HMS *Black Prince* to respond. The Crisbeq battery of 3/HKAA.1261 with its massive 210mm guns and the neighboring 4/HKAA.1261 in Azeville engaged the destroyers USS *Corry* and *Fitch*, which were exposed and in plain view after

a support aircraft that was supposed to lay a smoke screen was shot down. While maneuvering to avoid the fire, the *Corry* struck a mine amidships, cutting it in two; German accounts claim it was a victim of the coastal guns. The Crisbeq battery was subjected to the most intense fire, first by the cruiser USS *Quincy* and then by the battleship USS *Nevada*. *Nevada* scored a direct hit on the one of four bunkers with a 5in. round, but it was a dud, passing through the bunker and out the other side. The battery lost the first of three guns in the early morning exchange, the second at 1557hrs and the last at 1830hrs. *Nevada* also hit one of the Azeville casemates directly through the embrasure, putting it out of action. The naval coastal battery of 4/HKAA.1260 at Longues-sur-Mer located between Omaha and Gold Beaches was active for most of D-Day and its story is detailed in the notes opposite.

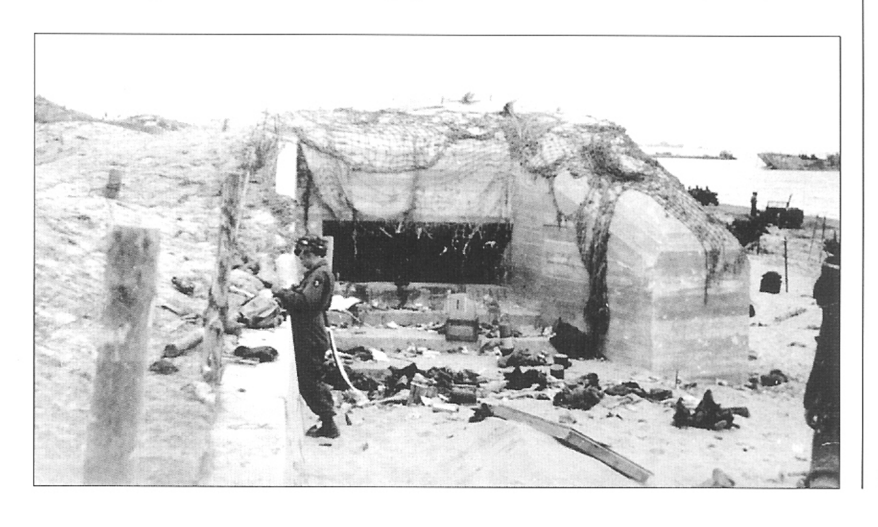


The Azeville battery contained four 105mm gun casemates including these two H650 casemates on the north side of the battery. The casemate in the background was a modified design with a 37mm Flak position mounted on the roof. During a gun duel with the USS *Nevada*, the gun in the casemate to the right was knocked out by a direct hit. (Author)

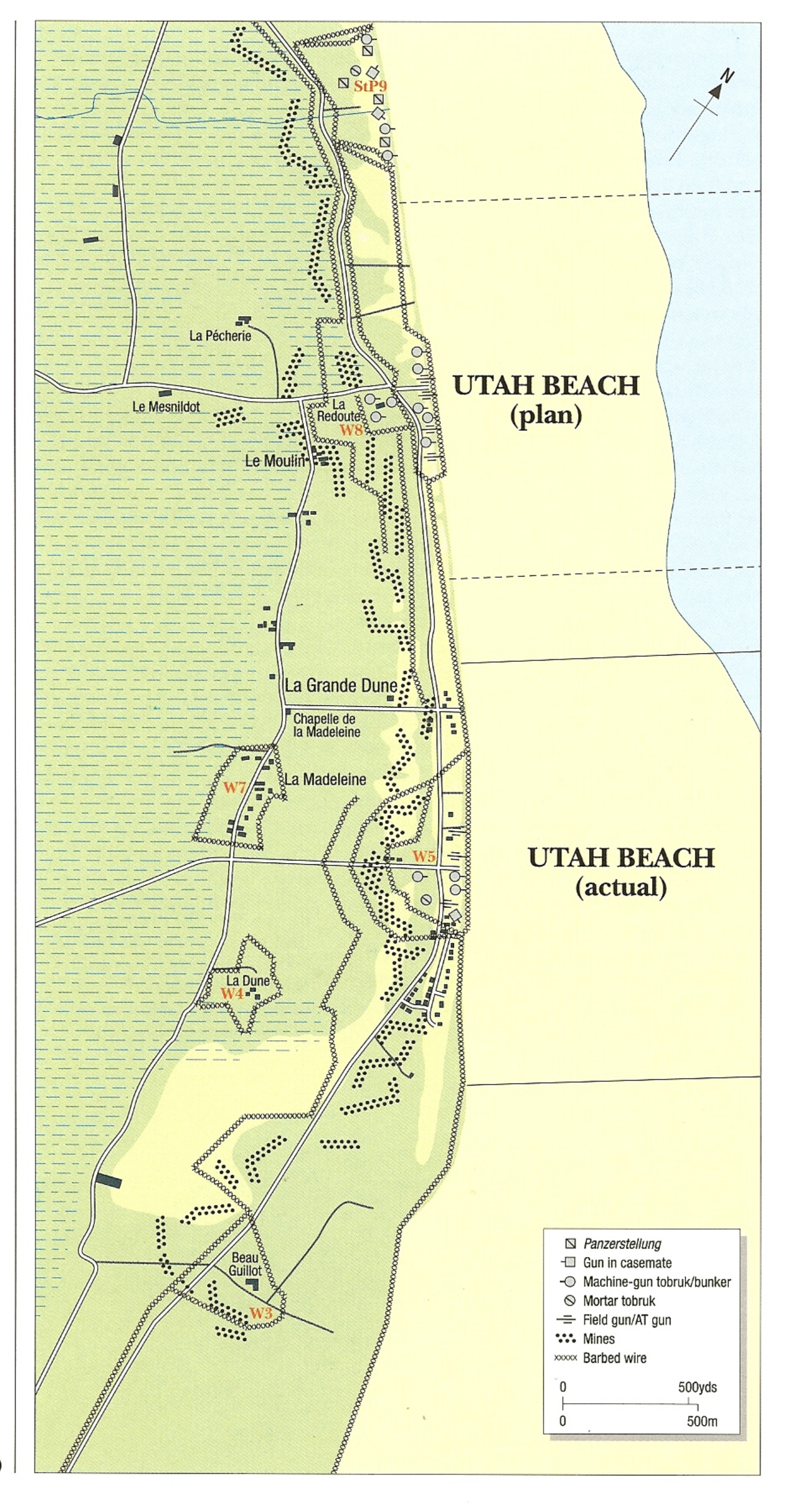
Utah Beach

Of all the landings, those on Utah Beach went the smoothest. The assault waves landed further southeast than intended, opposite strongpoint W5. This mistake benefited the US assault force as the fortifications in this sector were weaker than those further northwest. The intended landing area included two major strongpoints consisting of StP 9 (WN101) with an 88mm enfilade gun bunker, a fully enclosed M19 automatic mortar bunker and several other weapons bunkers, and the neighboring W8 (WN106) with two pedestal 50mm guns, two casemates with field guns and a 47mm anti-tank gun. W5 (WN104), had two 50mm pedestal guns, an H667 enfilade 50mm gun casemate, a 47mm anti-tank gun in a field entrenchment, a tobruk with FT tank turret, three machine-gun tobruks, a 50mm mortar tobruk and several personnel, ammunition and command bunkers. The German defenders in W5, a platoon from 3/GR.919 commanded by Lt. Arthur Jahnke, were thoroughly shaken up by the preliminary air and naval bombardment. Tanks of the 70th Tank Battalion arrived quickly to support the infantry and the bunkers were blasted by tank fire. Jahnke ordered his troops to deploy the newly arrived Goliath remote control demolition vehicles, but the command wires had been broken by the bombardment, and the Goliaths never left their hidden nests. Jahnke, a decorated Eastern Front veteran with the Knight's Cross, was finally pulled from the ruins of his command bunker around noon. But by that time, troops of the US 4th Infantry Division were already past the beachhead and heading inland to meet up with the paratroopers who had landed in the pre-dawn hours.

Although the US 4th Infantry Division lost few troops in its initial encounter with the Normandy beach defenses, fighting would continue against coastal fortifications for the next several days as its units were assigned to clear out the strongpoints along the Cotentin



One of the principal elements of the W5 (WN104) strongpoint at Utah Beach was this H667 enfilade-fire casemate for a 50mm gun. Normally, the embrasure would be shielded by a camouflage net to hide its function. (NARA)



OPPOSITE TOP LEFT The Utah Beach area included some improvised defenses as well, such as this French 47mm anti-tank gun in a field entrenchment in strongpoint WN100 at the Dunes de Varreville. (NARA)

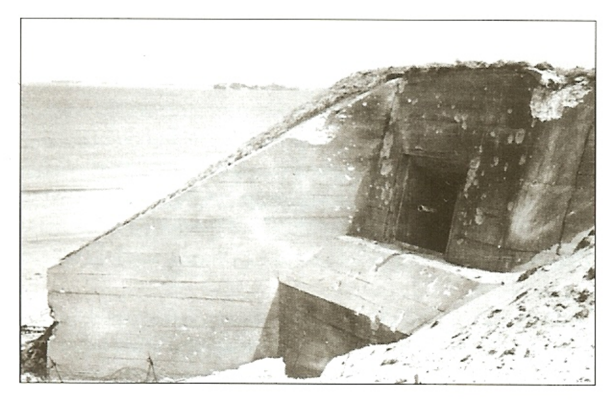
OPPOSITE TOP RIGHT Had the Utah Beach landings proceeded as intended, US troops would have faced the more substantial defenses of WN100 in the Dunes de Varreville. This H633 casemate was one of the fully enclosed types armed with a heavy machine gun facing the beach, where the fire can be seen. Its principal armament was a very potent 50mm M19 automatic mortar in a traversable roof cupola, not evident in this view. (NARA)

OPPOSITE BOTTOM LEFT The strongpoint at W10 (WN101) at Varreville, the intended Utah landing site, had more formidable defenses than the actual landing site including this modified H677 gun casemate which has been built up higher than the standard configuration. (MHI)

OPPOSITE BOTTOM RIGHT The formidable concentration of casemates and bunkers on the right flank of the Utah Beach landing remain largely unchanged to this day and include this Vf58 tobruk in the foreground and a pair of H676 casemates for Skoda 47mm anti-tank guns closer to the beach. (Author)





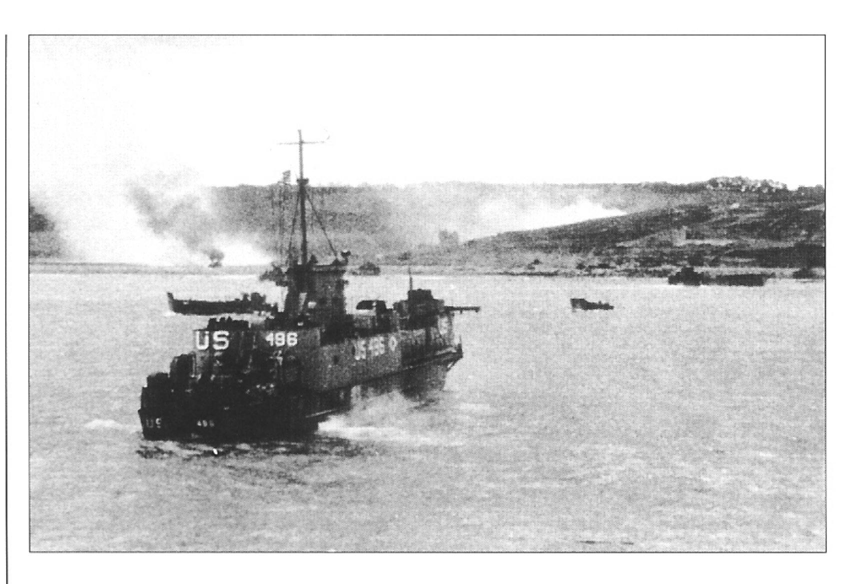




coast to the northwest. This would culminate in assaults on some of the most formidable strongpoints, for example the naval coastal gun batteries such as Crisbeq, which was first subjected to infantry attack on June 7, 1944. The campaign on the Cotentin Peninsula eventually ran into the most substantial fortifications in the region, surrounding the port of Cherbourg, later in June 1944.

Bloody Omaha

Omaha Beach was the only landing area where the outcome was ever in doubt. The fighting raged for 18 hours, concentrated around the "draws," the gullies that cut through the bluffs allowing access off the beach. The draws had been fortified with bunkers on either side to provide overlapping fields of fire, and the draw entrances were blocked by anti-tank walls, seawalls, anti-tank ditches and other obstructions making the passage of tanks difficult. The assault began badly when US Army Air Force bombers missed their targets by several miles due to cloud cover, leaving the bunkers below unscathed. Although a naval bombardment preceded the landing, its duration was shorter than at other beaches since the timing of the landings was dependent on the tides and the Omaha landings were the earliest. To further undermine the attack, one of the two tank battalions landing to support the infantry, the 741st, launched their two companies of DD amphibious tanks in rough water and all but five sank. Of the five that made it to shore, three were knocked out in quick succession by guns in strongpoints WN61 and WN62. Around 0630hrs, a company of M4 tanks with wading trunks came ashore, providing the only tank support for the 16th Infantry Regiment on the eastern side of Omaha Beach.



Taken mid-morning on D-Day, this photo shows WN62 in combat. The strongpoint is on the hill to the right of the photo, and the smoke is rising from the Colleville draw from the resort villa that the strongpoint troops used as a canteen. The LCI in the foreground was one of those involved in the late morning attempts to reinforce the beleaguered Cos. E and F of the 16th Infantry on the beach in front of WN62. (NARA)

Machine-gun fire, mortars, artillery and *Nebelwerfer* rockets decimated the first wave of assault troops. The tanks were one of the few means to deal with the numerous bunkers. The many tobruks proved to be very difficult targets for the tanks, since they were flush to the ground and difficult to spot amidst the smoke and confusion. The intense fire against the first wave prevented the engineer gap-breaching teams from breaching an adequate number of paths through the offshore obstacles. This would cause problems later in the morning during attempts to land additional reinforcements since the rising tide concealed the remaining obstacles, making it impossible for the landing craft to approach safely.

The experience of strongpoint WN62 is typical of those on D-Day. This sector of the beach defenses from WN59 to WN64 was manned by the 3rd Company, Grenadier Regiment 726, 716th Infantry Division, along with some reinforcements from the 352nd Infantry Division, and commanded by Lt. Edmond Bauch. Strongpoint WN62 was situated on Easy Red Beach on the western shoulder of the E-3 Colleville draw. The naval bombardment at dawn did not kill any of the 31 troops in the strongpoint, but left one lightly wounded and disabled two stationary flamethrowers. As the off-course LCVP landing craft from Co. E and Co. F, 16th Infantry Regiment, approached, they were brought under fire by several machine guns, two 76mm field guns in casemates, three 50mm mortars and a pedestal-mounted 50mm gun. One of the German gun crew later recalled, "we watched the landing craft under the direct fire of our guns and could see precisely what happened to the Americans, it was terrible." Most of the casualties occurred after the ramps were dropped when machine-gun fire from the trench line above cut a swath through the disembarking troops. On one LCVP, only seven GIs reached the beach of the original 32. It was only slightly better in the other 13 landing craft that landed



This is the 50mm anti-landing gun commanded by Corp. Siegfried Kuska in strongpoint WN62 that covered the entrance to the Colleville draw. It was emplaced in an ordinary field entrenchment as there was not enough time to construct the usual reinforced gun pit. (NARA)



One of the rarer defensive features at Omaha Beach was this VK.3001 tank turret on an H246 bunker, part of WN68. Krupp only completed six of these prototype tanks and their turrets were later released for fortification purposes. A further six new-production T.3001 turrets were built later, four ending up on the Atlantic Wall and two on the Westwall. (NARA)

in this sector in the first wave. One LCVP lucky enough to land away from the most intense fire got all 32 men to the shore, but only 20 GIs survived the run across the beach. Within moments, Co. F had lost six officers and half its troops. Some of the infantry tried to use the beach obstructions for cover, but this could have tragic consequences. In several instances, machine-gun fire from WN62 set off the mines on the obstacles, killing the infantry below.

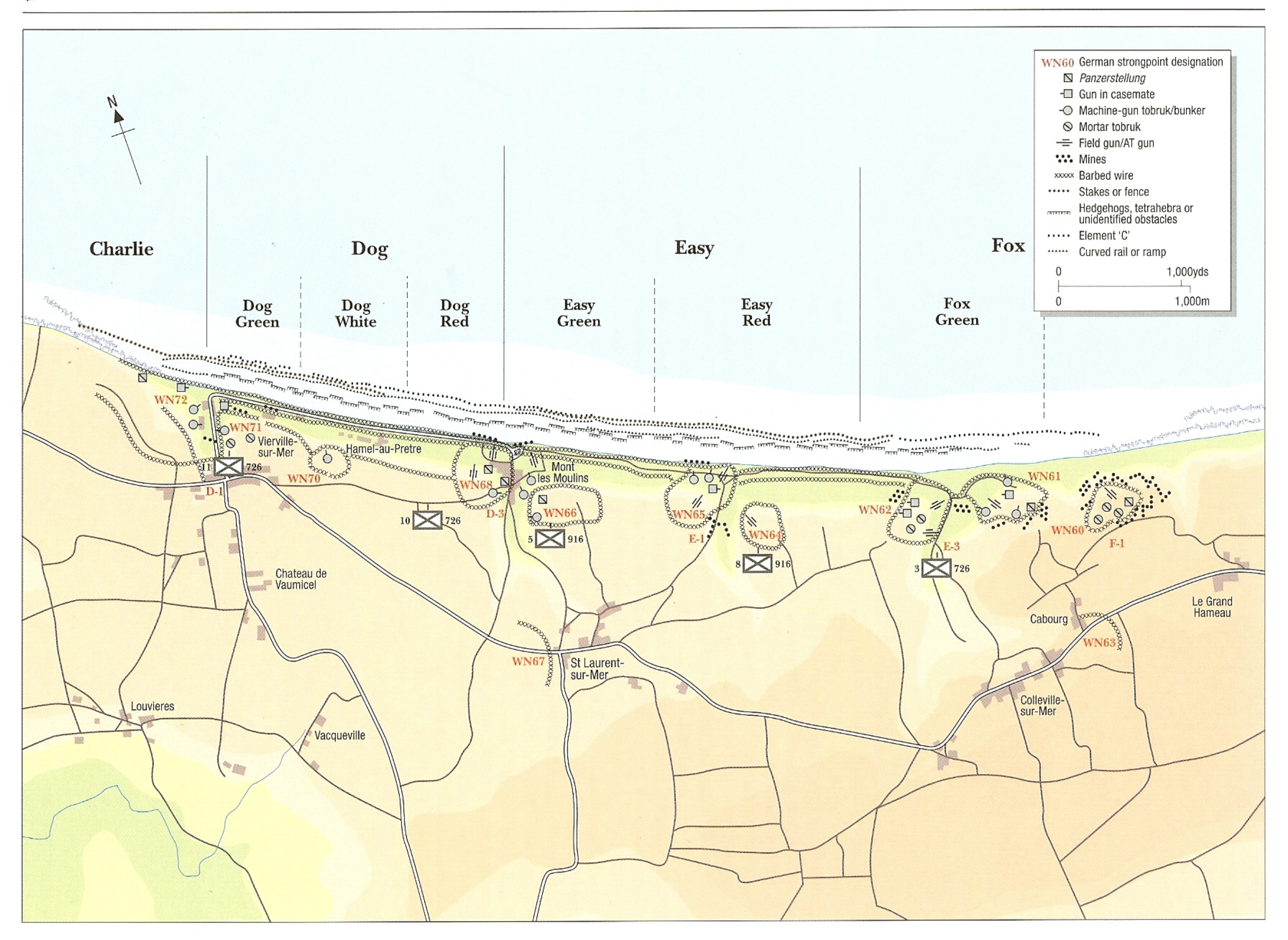
The strongpoint included an observation team from the divisional artillery of the 352nd Infantry Division led by Lt. Bernhard Frerking, and these officers directed 105mm artillery fire against the beach, taking an especially heavy toll on the engineer gap-breaching teams. The LCM carrying Team 16 was hit moments after the engineers had gotten out, but so many were wounded that they could not carry out their mission. Further east, Team 14 got most of the army engineers off their LCM before an artillery round hit while the navy team was disembarking, detonating their explosives. Several landing craft were hit by 50mm and 76mm gunfire, and numerous craft were damaged after running into stakes, detonating the mines on top. Most assault teams suffered even heavier losses to the machine guns in WN62; gap-breaching Team 11 lost half its engineers within minutes.

The 76mm gun in the casemate closest to shore fired only a few rounds before one exploded inside, forcing the crew to temporarily abandon it. German survivors recall the casemate being bracketed by naval gunfire and attributed its loss to US destroyers. However, it was shielded from the sea and more likely the gun was hit by fire from one of the tanks of the 741st Tank Battalion. The casemate was reoccupied and put back into action. Several M4 tanks were knocked out or damaged by WN62's pedestal-mounted 50mm gun that covered access to the road to Colleville.

The Normandy strongpoints were designed to be mutually supporting, and the neighboring WN61 strongpoint to the east of WN62 had an 88mm gun in a

This is one of the 76.5mm FK M17 field guns of strongpoint WN62 knocked out during the fighting by a direct hit against the gun shield by a 75mm high explosive round from an M4 tank of the 741st Tank Battalion. It was pulled out of the casemate after the fighting and is seen here resting on the hill over the Colleville draw. (NARA)





WN60 German strongpoint designation
Panzerstellung
Gun in casemate
Machine-gun tobruk/bunker
Mortar tobruk
Field gun/AT gun
Mines
Barbed wire
Stakes or fence
Hedgehogs, tetrahebra or unidentified obstacles
Element 'C'
Curved rail or ramp
0 1,000yds
0 1,000m
N
Charlie
Dog
Easy
Fox
Dog Green
Dog White
Dog Red
Easy Green
Easy Red
Fox Green
WN72
WN71
WN70
WN68
WN66
WN65
WN64
WN62
WN61
WN60
WN67
WN63
D-1
D-3
E-1
E-3
F-1
11 726
10 726
5 916
8 916
3 726
Vierville-sur-Mer
Hamel-au-Pretre
Mont les Moulins
Chateau de Vaumicel
St Laurent-sur-Mer
Cabourg
Colleville-sur-Mer
Le Grand Hameau
Louvieres
Vacqueville



This is the lower H612 field gun casemate at the WN62 strongpoint, commanded at the time by Corp. Heinrich Krieftewirth. The extensive damage to the front embrasure is very evident in this view, caused both by naval artillery and tank fire from the 741st Tank Battalion. (Author).

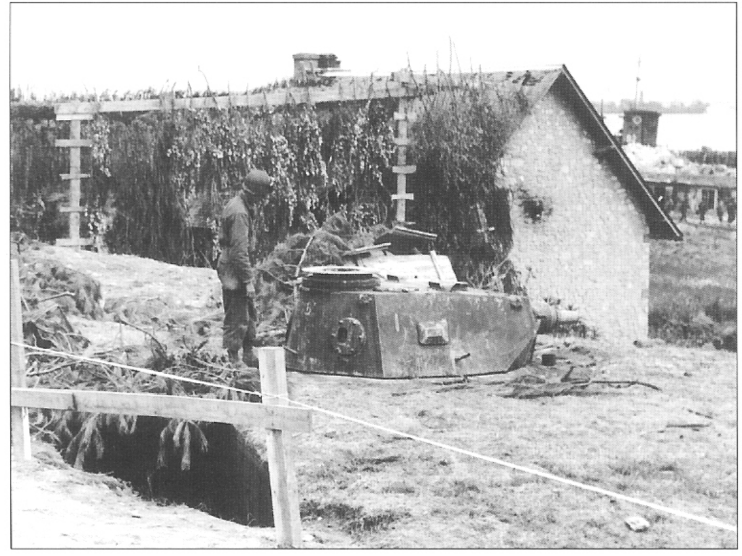
heavy H677 casemate. This gun was particularly effective against both US tanks and landing craft, and when the third wave of US troops landed, the 88mm scored a direct hit on one of the LCVPs. One of the four M4 tank dozers that was clearing obstructions at this time was also hit, probably from this gun. In the event, this was its last success, as around 0710hrs an M4A1 tank of the 741st Tank Battalion managed to position itself to fire directly into the embrasure of the bunker, knocking out the gun. Strongpoint WN60 to the east was one of the first to fall in this sector around 0900hrs, and WN61 was largely silenced by tank and naval gunfire within a few hours of the landing.

The obstacles continued to take their toll. The most serious problem emerged around 0800hrs as the tide came in. Since so few obstacles had been cleared in this sector, at 0830hrs the beach-master ordered that no other landing craft attempt to land. So for nearly two hours the units already ashore received no reinforcements.

The weaknesses in the German defenses were not immediately evident, but they were already failing. A platoon from Company E under Lt. John Spalding had landed to the west of WN62, found a gap in the German defenses between the strongpoints, and climbed over the bluff around 0730hrs. The gap between the strongpoints was laced by mines, and guarded by two machine guns in field entrenchments, grandly designated as WN62a, near where today's famous US cemetery is located. Spalding's platoon overwhelmed the two machine-gun nests and continued to move inland toward Colleville-sur-Mer. The platoon drew fire from both WN62 on its left and WN64 to its right, but the steady trickle of GIs through this gap started the first major penetration of the Omaha Beach defenses on D-Day. The commander of GR.726 in this sector radioed back to 352nd Infantry Division headquarters asking for a counterattack to throw back the American penetration. A battalion was scheduled to arrive around 0930hrs, but never did as it was trapped on the roads by

The WN62 strongpoint overlooked the Colleville draw, seen to the right in this photo taken in 2004 from near the mortar tobruk. (Jim Carswell)





Another example of one of the VK.3001 *Panzerstellung*, located at the WN68 strongpoint covering the Saint Laurent draw. (NARA)

persistent Allied fighter-bomber attacks. The WN62 detachment would have to hold out with no reinforcements.

By 0900hrs, much of Co. E and Co. F was still trapped on the beach in front of strongpoint WN62 and casualties had been appallingly high, at least half the troops who had landed. The US troops called for naval gunfire and, around 0920hrs, WN62 was hit by a 25-minute bombardment by the USS *Arkansas*. At 1012hrs, the forward command post at WN62 radioed back to GR.726 headquarters that "WN60 is holding, WN62 is firing with one machine gun, but the situation is critical. The rest of the 1st and 4th companies are counterattacking." In fact, WN60 had already fallen and there were no counterattacks. WN62's two 76mm gun casemates were both silenced by 1015hrs. Although both bunkers were hit numerous times by naval gunfire, it was tank fire that finally silenced the field guns. The upper casemate had been hit on the outside 27 times, mainly by naval gunfire, and nine times inside, mainly by tank fire. The lower casemate had been hit 18 times on the outside and seven times inside. Around 1100hrs, the 741st Tank Battalion rallied its remaining three tanks near the E-3 exit. They proceeded to attack the remaining positions in WN62, though two of the three tanks were disabled in the action.

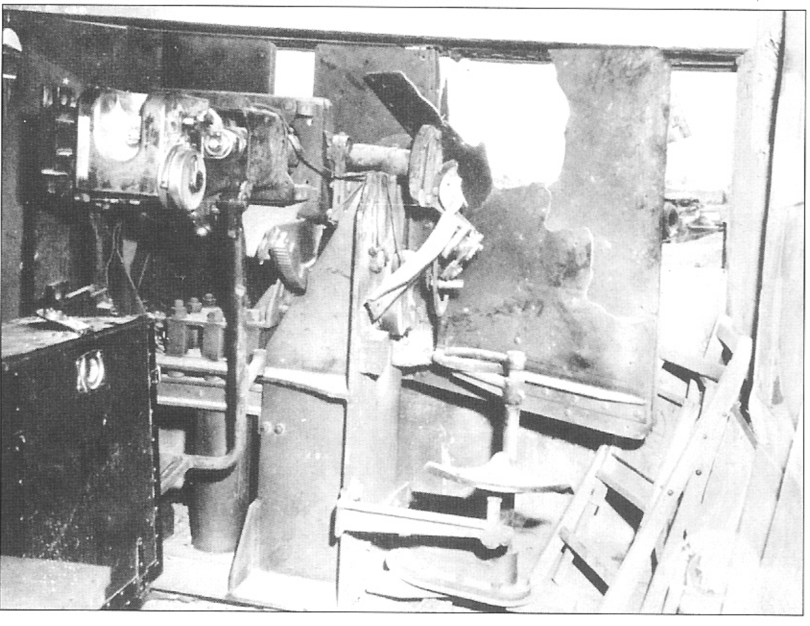
By late morning, the intensity of the fighting around WN62 had subsided as US infantry bypassed the strongpoint. The German positions were starting to run low on ammunition, and one surviving MG42 machine gunner, Hein Severloh, recalled firing off all 12,000 rounds of ammunition available. By this time, the US infantry was beginning to use 60mm mortars against the defenses in WN62, which proved much more effective than direct-fire weapons. By late morning, the GIs were beginning to probe into the defenses of WN62, and few of the crew-served weapons were still functioning. The infantry penetration to the west had expanded after 1030hrs when LCIs crashed through the beach obstacles and began disgorging reinforcements in the relatively secure area between WN62 and WN64. When the WN62 artillery forward observer called in fire against landing craft on the beaches from the battery near Houteville around noon, he was told that the battery was now out of ammunition and no further fire support would be coming that day. Fewer than half the original troops in WN62 remained as many of the wounded had been sent to the rear during interludes between artillery attacks. By noon, the 741st Tank Battalion could no longer find targets worth engaging. In the early afternoon, two US destroyers began pounding the remaining bunkers on either side of the Colleville exit, including WN62. The last remaining machine-gun post was finally

This 50mm anti-tank gun in an H667 casemate proved to be one of the most effective elements of the WN65 strongpoint covering the E-1 St. Laurent draw. It was finally silenced by 37mm automatic cannon fire from a pair of M15A1 multiple gun motor carriage half-tracks of the 467th AAA Battalion. (NARA)



put out of action in the early afternoon when it was hit by tank fire. Strongpoint WN62 was largely abandoned by mid-afternoon after the few surviving troops in the command bunker pulled back to Colleville.

The fighting around WN62 on D-Day was a clear example of how effectively a modestly fortified position could resist an infantry attack. The German detachment of 31 men held out for about nine hours, and inflicted several hundred American casualties. Of the 11 US tanks to make it ashore in the assault waves near WN62, seven were knocked out and two damaged by anti-tank guns, while one was lost to mines. The beaches in front of WN62 were littered by over a dozen smashed and burning landing craft, some destroyed or damaged by obstacles, others by direct gunfire from WN62, and the rest by artillery fire called in by the WN62 observation post.



This shows the effect of the 37mm fire on the 50mm pedestal gun inside the H667 casemate of WN65 with the gun-shield collapsed on the right side. This casemate and gun are still preserved. (NARA)

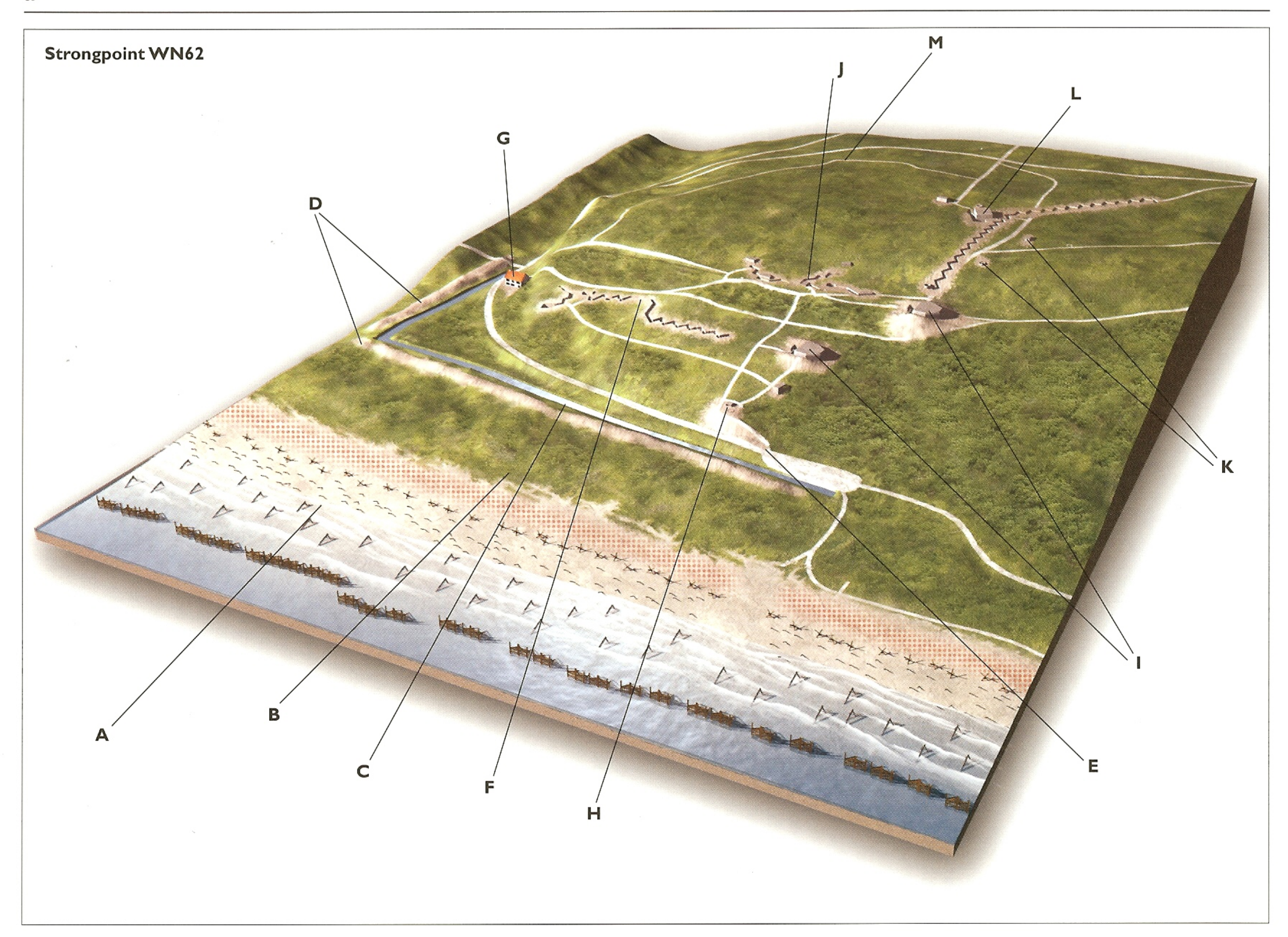
WN62 enjoyed the advantage of its elevated position over the beach, giving its numerous weapons clear fields of fire. The steep hill also prevented US tanks from maneuvering around the position, and the tanks of the 741st Tank Battalion were trapped on the narrow confines of the beach until late in the day when the Colleville draw was finally cleared. This situation contrasts sharply with the situation on the neighboring beaches where the flat terrain permitted the tanks to rapidly escape the killing zones on the beach and maneuver around the German strongpoints from the landward side.

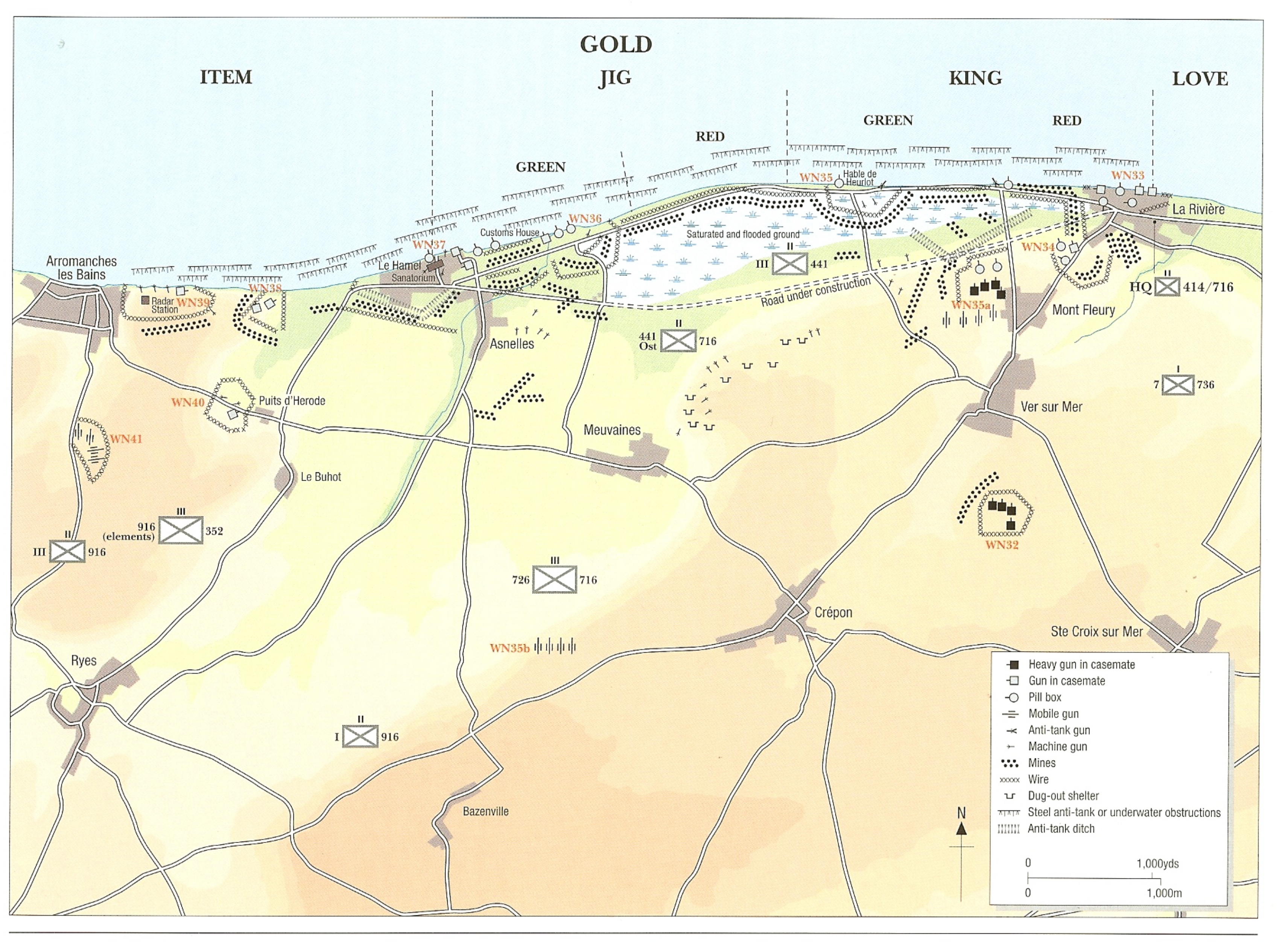
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Strongpoint WN62

Strongpoint WN62 was located on the bluffs on the western shoulder of the E-3 Colleville draw. The combat actions by this strongpoint are covered in more detail in the text. The strongpoint was typical of those on Omaha beach. The position was roughly 250m (800ft) in diameter and 12 to 50m (40 to 165ft) in elevation over the beach below. The initial defenses (A) featured a sequence of beach obstructions including Belgian gates, ramps with Teller mines, Czech hedgehogs, stakes and scattered anti-personnel mines. There was little cover for US assault troops until they reached the seawall (B), which was about 1.5m (5ft) high. The next defensive barrier was an anti-tank ditch (C) 1.5m (5ft) deep and 2m (7ft) wide, filled with water and covered by two static remotely operated flamethrowers (D) at the eastern corner. The perimeter of the strongpoint was ringed by a barbed-wire fence (E). There were four main concentrations of structures and bunkers in the strongpoint. At the northeastern corner (F) was a cluster of field entrenchments intended to cover the anti-tank trap and the access into the Colleville draw. The main weapon here was a pedestal-mounted 50mm gun and it was covered by two Polish 7.92mm water-cooled machine guns in trenches. Slightly to the east of the position was an old resort villa (G) that the strongpoint used as a canteen for preparing meals. In the northwest corner of the strongpoint there was a tobruk (H) with an MG34 machine gun guarding the access to the strongpoint and, further up the hill, were the two H669 enfilade gun bunkers (I) with 75mm field guns that fired along Omaha Beach to the northwest. Midway up the bluff was the command center of the strongpoint including the artillery observation bunker and its associated radio bunker. This area was protected by three MG34 machine guns in trenches, one on an anti-aircraft mount. There was a pair of 50mm mortar tobruks (K) up the bluff from the upper field gun casemate, to provide fire support for the forward positions. The final concentration of emplacements in the strongpoint were on the crest of the bluff (L) and included a 20-man bunker for the garrison, another 50mm mortar tobruk and a bunker containing the signaling equipment used to communicate with neighboring WN61 on the other side of the draw. On the southeastern side of the position was a single 50mm pedestal gun in a field entrenchment (M) to cover the rear of the position.

Strongpoint WN62





GOLD
ITEM
JIG
KING
LOVE
GREEN
RED
GREEN
RED
WN33
WN34
WN35
WN35a
WN35b
WN36
WN37
WN38
WN39
WN40
WN41
WN32
Hable de Heurlot
La Rivière
Customs House
Saturated and flooded ground
Le Hamel
Sanatorium
Arromanches les Bains
Radar Station
Road under construction
Asnelles
Mont Fleury
HQ 414/716
441 Ost 716
III 441
7 736
Ver sur Mer
Puits d'Herode
Meuvaines
Le Buhot
916 (elements) 352
III 916
726 716
Crépon
Ste Croix sur Mer
Ryes
I 916
Bazenville
Heavy gun in casemate
Gun in casemate
Pill box
Mobile gun
Anti-tank gun
Machine gun
Mines
Wire
Dug-out shelter
Steel anti-tank or underwater obstructions
Anti-tank ditch
N
0
1,000yds
0
1,000m

This view shows the same H667 casemate from WN65 from the rear. As can be seen, a wall protects the rear armored door, but evidently the wall was breached and the door caved in, probably by tank fire. These bunkers were sometimes knocked out, reoccupied by other German troops and knocked out again during the course of the D-Day fighting. (NARA)

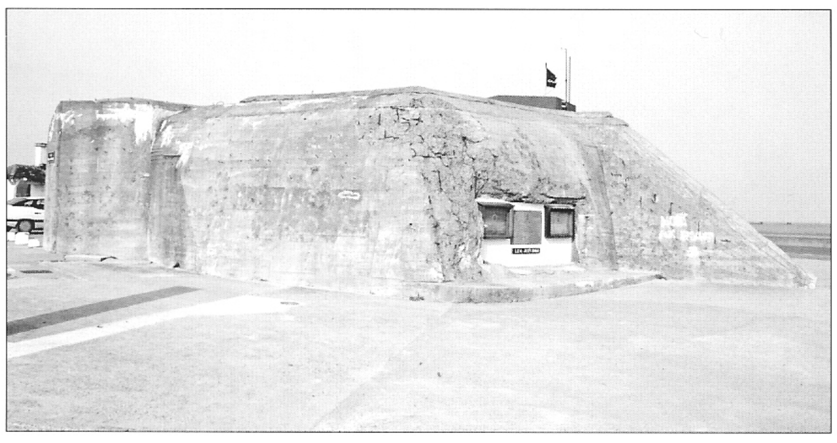


On the other hand, the fighting for WN62 also illustrates why the German defenses failed on D-Day. In spite of the horrific casualties inflicted on the 16th Regimental Combat Team, there were significant penetrations past WN62 less than an hour after the landings, and the strongpoint had been rendered ineffective and bypassed within four hours. The gaps between the strongpoints were vulnerable, and even with infantry from the 352nd Infantry Division on hand behind the beach, there was no real defense in depth. Once the thin crust of beach fortifications had been overcome, the defenses had been effectively breached.

Gold Beach

The attack on Gold Beach by the British 50th Division was two brigades wide and faced a significant number of strongpoints. Of all the fortifications along Gold Beach, WN37 at Le Hamel on the extreme western end of the beach proved to be the most troublesome. Built around a sanatorium, the most formidable bunker in the strongpoint proved to be an H612 enfilade-fire bunker armed with a World War I 75mm field gun. The Allied planners had expected trouble from this strongpoint, and besides the naval bombardment, it had been hit by a dozen Typhoon fighter-bombers shortly before the landings with 1,000lb bombs, which did not have much effect. As tanks and infantry came ashore, the 75mm gun and a supporting 50mm gun pounded them. The 75mm gun accounted for at least two flail tanks and also managed to damage the bow of an LCT, trapping the tanks inside. Naval bombardment was unable to silence the gun since the embrasure was protected from the sea by the usual reinforced seaward wall, and the attacking 1st Hampshires had lost radio contact with the destroyers. A Sherwood Rangers' Sherman attempted to maneuver to a fire position, but was knocked out by the gun before it could

This H612 casemate with a 75mm field gun proved to be the most troublesome defensive position in WN37 in Asnelles. The embrasure has been sealed up since the war, and it is currently located near a lighthouse, barely evident behind. (Author)





Although the H612 casemate in WN37 was long believed to be the main source of fire along the western side of Gold Beach, in fact a pair of 75mm FK38 field gun casemates from WN39 on a hill in nearby Saint Côme-de-Fresné were heavily involved in the bombardment. This recent photo shows the excellent view of Gold Beach from one of the WN39 casemates. (Author)

do so. Although most of the problems in this sector have been attributed to WN37, in fact its firepower had been augmented by WN39 on a hill 2.5km to the west overlooking Gold Beach. This strongpoint included a pair of 75mm FK38 field guns, one of which fired some 124 rounds against the British troops on Gold Beach. The German defenses toward the center of Gold Beach proved less formidable, and troops managed to overcome the initial defenses and press inland, bypassing the troublesome strongpoint.

The situation on the eastern side of Gold Beach somewhat replicated the western side as there was an H677 enfilade bunker with an 88mm PaK 43/41 positioned in WN33 that quickly took a toll of British tanks as they arrived along the beach. This bunker proved to be more short-lived than the one in WN37, as a Sherman flail tank approached it from close range and placed a well-aimed shot through the embrasure. The four field-gun bunkers of WN35b at Hable-de-Heurot were assaulted by the 6th Green Howards supported by Churchill AVRE (Armoured Vehicle Royal Engineers) tanks; their Petard mortars made short work of the casemates and Sergeant-Major S. E. Hollis of the Green Howards was awarded the Victoria Cross for "utmost gallantry" during an attack on one of the positions. In general, the numerous artillery batteries along Gold Beach proved to be much less dangerous than was anticipated due to the effective preliminary naval bombardment. The army coastal battery at strongpoint WN35a on Mont Fleury had been roughed up by the preliminary air attack and then struck repeatedly by HMS *Orion*. The Green Howards overran the position shortly after they dispatched the gun bunkers at WN35b, and there was little resistance from the German artillerymen. The 6th Battery of AR.1716 at WN32 was armed with Czech 100mm field guns in four sturdy H669 bunkers but under air attack and the gunfire of HMS *Belfast*, they retired to their personnel bunkers where they were captured.

The defenses at WN37 around the Le Hamel sanatorium were finally overcome in mid-afternoon after they had been outflanked from the landward side. The deadly 75mm bunker was finally silenced when a Churchill AVRE placed a Petard round against the armored rear door, blasting the interior in the process.

Juno Beach

At Juno Beach, the preliminary naval bombardment was not as effective as hoped, and a later Royal Navy survey concluded that only 14 percent of the intended targets had been put out of action. Nevertheless, the bombardment did have important consequences. A 75mm bunker at the extreme western side of Juno Beach had been silenced by the naval gunfire, and the 7th Brigade, 3rd Canadian Infantry Division, landings on the western side proceeded as planned

A view of the preserved 50mm gun emplacement in St. Aubin-sur-Mer today, with wartime damage still evident. The thick wall toward the sea proved so substantial that the emplacement finally had to be taken by an attack by infantry of the North Shores, 8th Brigade, moving through the village. (Author)



without the havoc wreaked on Gold Beach by the enfilade bunkers. Nevertheless, German fire was intense and in one flotilla of five LCA landing craft, four were sunk or severely damaged by mortar fire, obstructions and mines on the obstructions. The Canadian infantry overcame the tobruks and other defenses with close support from accompanying tanks, but minefields and craters in the dunes held up the advance off the beach in the 7th Brigade sector.

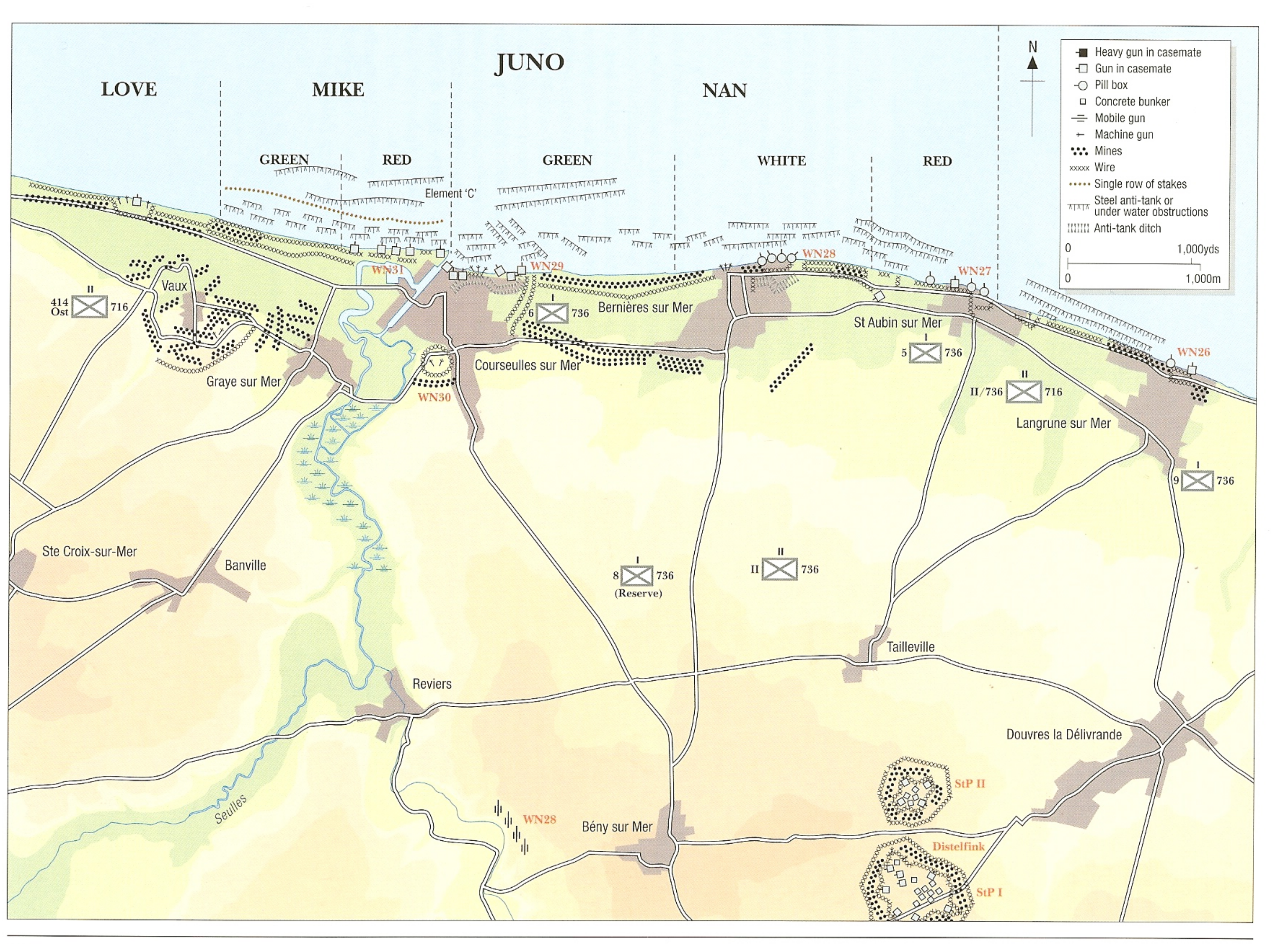
Further to the center at Courseulles, WN29 contained a formidable array of defenses including an H677 88mm enfilade bunker and a pair of H612 bunkers with 75mm guns. All three were silenced by Royal Marine Centaur tanks supported by tanks of the 26th Assault Squadron RE, who fired into their open embrasures. Before the bunkers had been silenced, they had done a fair amount of damage: one of the 75mm guns was littered with about 200 shell casings, giving some idea of the amount of fire it had poured against the incoming Regina Rifles. Defenses in the town of Courseulles proved to be stubborn, and were supported by strongpoint WN30 on the hill beyond. A bitter house-by-house battle was fought for Courseulles through the morning, culminating in the envelopment and capture of WN30 around noon.

This H677 casemate armed with the formidable 88mm Pak 43/41 anti-tank gun formed the core of the WN29 strongpoint near the harbor in Courseulles-sur-Mer and is seen several days after D-Day after Canadian troops had established an anti-aircraft position on top with a 20mm cannon. (Ken Bell, NAC PA140856)

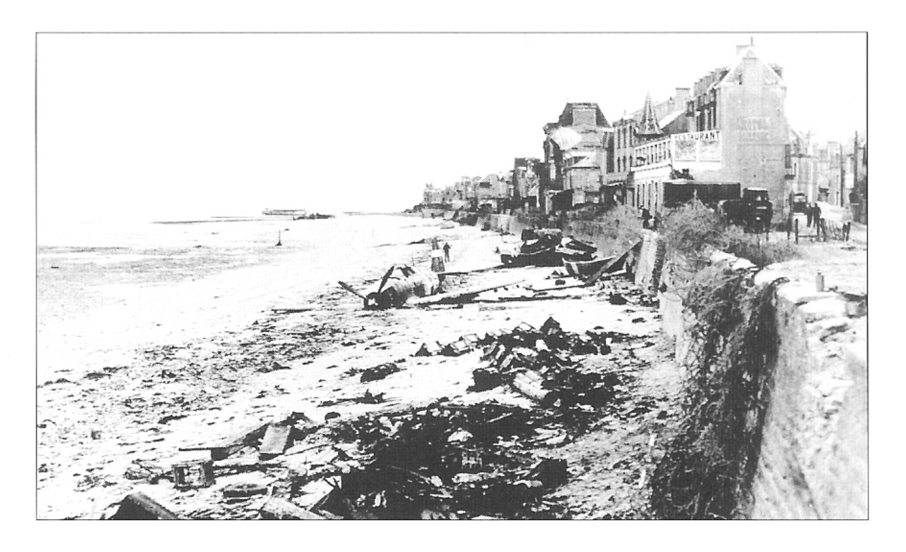


On the eastern side of Juno Beach, the Canadian 8th Brigade landed while under fire from strongpoint WN27 in the seaside village of St. Aubin-sur-Mer. The sea wall in this sector was high, sometimes over 3.6m (12ft). The most effective defense in the village was a 50mm pedestal-mounted gun in a non-standard bunker built into the seawall and this is detailed in the notes accompanying the artwork on page 23. Several tanks were knocked out in quick succession as they came ashore, and the 50mm bunker continued in action for over three hours until assaulted by infantry from the landward side around 1115hrs.

The situation was even hotter to the east where 48 RM Commando landed in front of WN26 near Langrune. The landing took place around 0900hrs when many of the offshore obstructions were partially or fully submerged, and caused widespread damage to their LCI


JUNO
LOVE
MIKE
NAN
GREEN
RED
GREEN
WHITE
RED
Heavy gun in casemate
Gun in casemate
Pill box
Concrete bunker
Mobile gun
Machine gun
Mines
Wire
Single row of stakes
Steel anti-tank or under water obstructions
Anti-tank ditch
0
1,000yds
0
1,000m
N
Element 'C'
WN31
WN29
WN28
WN27
WN26
WN30
Vaux
414 Ost
716
6 736
Bernières sur Mer
St Aubin sur Mer
5 736
II/736 716
Langrune sur Mer
Graye sur Mer
Courseulles sur Mer
9 736
Ste Croix-sur-Mer
Banville
8 736
(Reserve)
II 736
Tailleville
Reviers
Douvres la Délivrande
StP II
Distelfink
StP I
Seulles
WN28
Bény sur Mer

The beaches in the British/Canadian sector were edged by seawalls and many small resort towns, which created a barrier off the beach for the assaulting troops. This is a view from the 50mm anti-tank gun parapet in WN27 looking along the seawall in St. Aubin-sur-Mer on Nan-Red Beach taken after the landings. Some of the debris along the beach includes a P-47 Thunderbolt and a DD Sherman tank. (NARA)

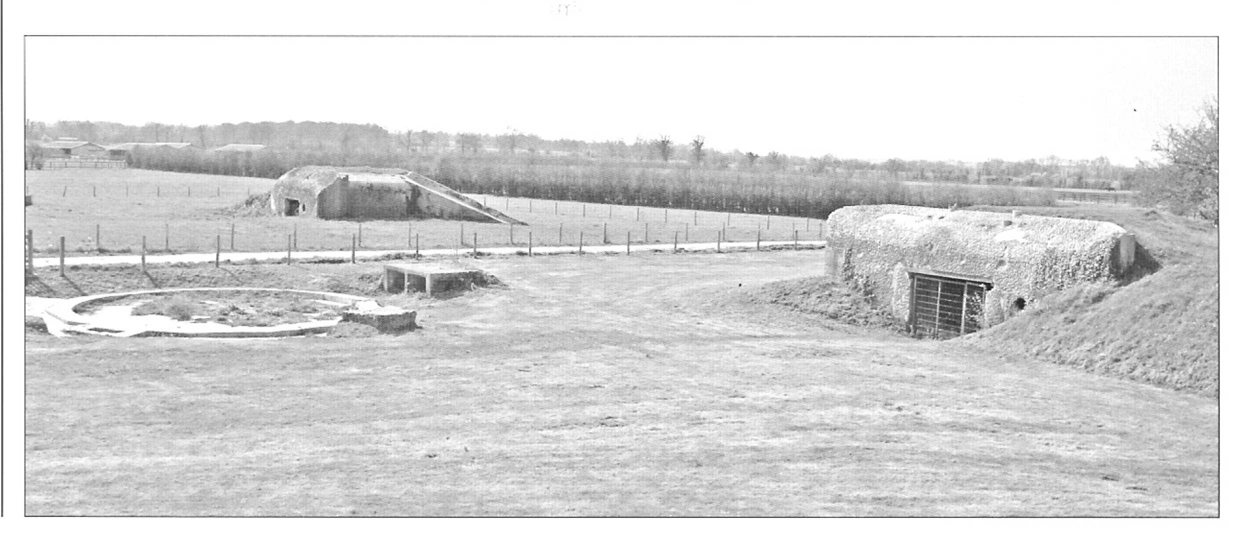


craft. Strongpoint WN26 included a 75mm field gun and defenses built into the existing seawall. A pair of Royal Marine Centaurs attempted to provide assistance, but one came to grief on a mine and the other found that its gun could do little against the concrete emplacements: 48 RM Commando suffered nearly 50 percent casualties in the morning and were unable to overcome the strongpoint.

Sword Beach

The assault by the 8th Brigade, 3rd Infantry Division, on Sword Beach was somewhat similar to the US 4th Infantry Division at Utah, landing along a fairly narrow corridor only two battalions wide but thereby concentrating the entire force against a single strongpoint. The 1st South Lancs landed west of WN20 in La Breche, codenamed "Cod." This strongpoint included an 88mm gun in an H677 enfilade bunker as well as three 50mm pedestal guns. At the same time, the neighboring 2nd East Yorks landed on its eastern side. The gun bunkers knocked out many Sherman flail tanks as they attempted to clear paths off the beach. The British infantry moved over the beach as quickly as possible to avoid the heavy fire against the shoreline. After the wire entanglements were breached, Cod was assaulted by elements of both battalions supported by DD tanks from 13th/18th Hussars and was overcome shortly after 1000hrs following nearly three hours of fighting. The defenses in the center portion of

One of the primary objectives of British airborne troops in the area east of Sword Beach was strongpoint WN01, the Merville battery. This shows two of its preserved H669 casemates, which had been armed with 100mm field guns at the time of their capture. To the left is one of the original kettle gun pits built prior to the construction of the casemates. The site is now preserved as a museum. (Author)

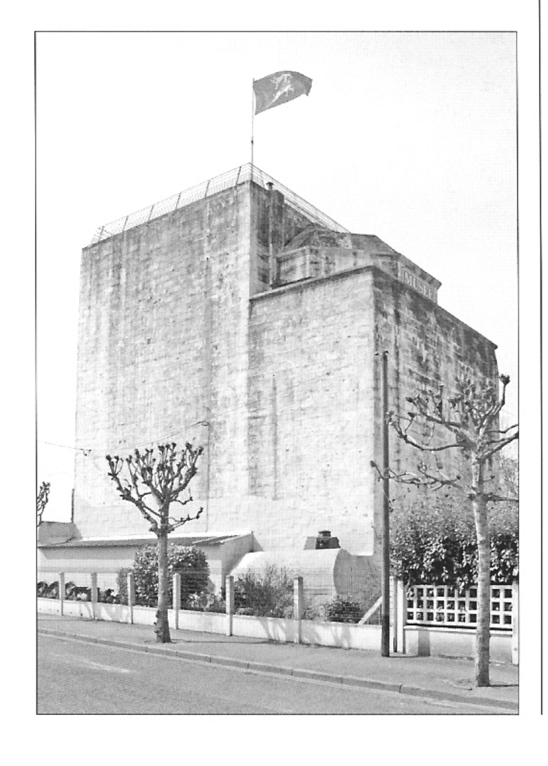


Sword Beach had largely been eliminated once Cod was overwhelmed, but the beach remained under fire from scattered snipers, mortars and artillery located away from the beach. The German defensive positions on either side of the 8th Brigade were assigned to Commando units.

In another parallel to the landings on the American beaches and the assault by the Rangers on Pointe-du-Hoc, the task of silencing the artillery batteries at the extreme eastern side of Sword Beach was assigned to 4 Commando. The battalion landed away from the defenses, and advanced eastward to attack the strongpoint from the landward side. Two French troops were attached to 4 Commando, and led the attack on WN10. The lightly armed French Commandos had a hard time dealing with the numerous defenses, which included a 75mm field gun in an H626 bunker, and the attack stalled. By this time, Sherman tanks from the neighboring 8th Brigade had arrived near Ouistreham, and a DD tank was dispatched to assist in the Commando assault. Once the WN10 defenses were overcome with the help of tank fire, 4 Commando proceeded to assault the artillery battery in the StP 08 strongpoint in Riva Bella. A multistory observation tower at the far end dominated the strongpoint. As the Commandos fought past an outer ring of tobruks and other defenses into the heart of the battery positions, they realized that the Germans had withdrawn the guns due to the pre-invasion bombardment, much as had occurred at Pointe-du-Hoc. German troops continued to hurl grenades from the observation tower, but rather than waste time and lives to capture the structure, 4 Commando left it for clean-up by follow-on troops.

To the west, 41 RM Commando assaulted strongpoint WN21 (Trout) in St. Lion-sur-Mer, which included a single 75mm field gun and two pedestal-mounted 50mm guns in open pits. Strongpoint WN21 was deserted but the neighboring chateau proved more difficult, and 41 RM Commando was unable to proceed to its secondary objective, the Luftwaffe radar station at Douvres, even with the help of tanks.

With the defenses on Sword Beach thoroughly penetrated, albeit not entirely subdued, the follow-on waves moved off the beaches to carry out their further objectives. The 185th Brigade proceeded through Colleville-Plage on their way to Caen, encountering two major fortified areas in the process: an artillery battery in strongpoint WN16, codenamed Morris, and the heavily fortified headquarters complex of Grenadier Regiment 736 in strongpoint WN17, codenamed Hillman. The 1st Suffolks overwhelmed the artillery battery at WN16 and then proceeded on to the Hillman complex. Minefields and barbed wire encircled WN17, and the British infantry fought their way into the strongpoint after breaching the wire. The personnel bunkers inside it were the heavy bomb-proof type as used on the Westwall, and not the more vulnerable tobruk type common elsewhere on the D-Day beaches. As a result, the 1st Suffolks brought up some 17-pdr anti-tank guns, attempting to crack open the bunkers by blasting their armored cupolas. There were so many bunkers and firing ports that it took the 1st Suffolks the entire day to overwhelm the headquarters, not finally eliminating the resistance until 2015hrs. Although casualties in the 1st Suffolks were not particularly heavy from the attack on Hillman, during the afternoon the 1st Royal Norfolks unwarily marched through a field within range of the strongpoint, and suffered about 150 casualties due to machine-gun fire. The prolonged resistance by strongpoint WN17, as well as the later counterattack by elements of 21.Panzer-Division, were some of the reasons that the 185th Brigade was unable to press on to its intended objective that day, the city of Caen.



One of the most imposing fortifications on Sword Beach was this observation position built into an existing water tower in the Trout strongpoint in Ouistreham. It has been preserved as Grand Bunker of the Atlantic Wall museum. (Author)

Strongpoint WN17, better known by its British codename Hillman, served as the headquarters for Grenadier Regiment 736. The site has been preserved and this shows the modified underground H608 bunker complex with its armored observation cupola evident in the upper right, facing toward the sea. (Author)



Panzerstellung
Gun in casemate/concrete gun pit
Field gun/AT gun
Anti-tank emplacements
Hedgehogs
Stakes
Double row of ramps
Anti-tank ditch
Barbed wire
0 1,000yds
0 1,000m

PETER
QUEEN
GREEN
WHITE
RED
ROGER
N
WN21 (Trout)
Lion-sur-Mer
La Brèche
WN20 (Cod)
WN18
Colleville-Plage
WN10
Riva-Bella
StP Caen 08
Banc des Corbeilles
Hermanville
Ouistreham
Locks
Bridge
WN19
WN14 (Sole)
HQ I/736/716
Colleville
WN16 (Morris)
WN12 (Daimler)
WN17 (Hillman)
HQ 736/716
Point 61
HQ I/1716
Périers
St-Aubin-d'Arquenay
Orne

Aftermath

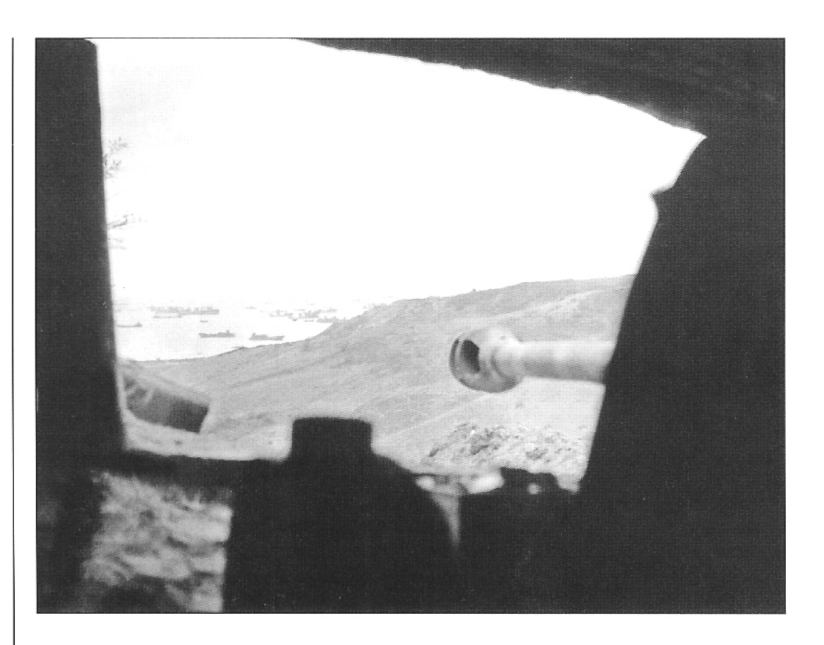
By the end of June 6, 1944, the German-fortified defenses along the D-Day beaches had been breached on all five landing beaches and most beach strongpoints had been completely cleared of their defenders. There were small pockets of resistance in many locations, and there were stretches of beach defenses between the five landing beaches that had not been attacked by the invasion forces. It would take several days of fighting to clear out these pockets. Some defenses were simply bypassed. The most notable example was the fortified Luftwaffe radar post at Douvres. British troops bypassed it on D-Day, but it served as a collection point for stragglers and did not surrender until assaulted by follow-on forces 11 days later.

A German perspective on the performance of the Normandy defenses was later offered by Gen. Lt. Wilhelm Richter, commander of the German 716th Infantry Division whose units occupied the strongpoints on Gold, Juno and Sword Beaches:

> Neither the offshore obstacles nor the stakes produced the results which were hoped for, particularly because the measures had not been completed everywhere. The large minefields laid by the troops did not produce the desired results because heavy bombing and fire from naval guns caused premature detonations. Large gaps were torn in the coastal defenses as a result of field works and reinforced field works not being strong enough to resist heavy bombings and naval gunfire. Dense smoke screens handicapped the aiming of fire against ships and landed troops. There was a lack of effective anti-tank defense, as two anti-tank companies were destroyed in their field emplacements by bombing. The German artillery was put out of action at an early stage as a result of bombing, naval gunfire and attack by enemy airborne troops. The Ost battalion which had been considered reliable failed. There was a lack of a second fortified line echeloned in depth.

Rommel's hope that the invasion could be stopped on the beaches was frustrated by a relentless and well-planned amphibious operation. The inadequate and hasty defenses along the D-Day beaches had failed in their mission, and most were overcome in less than three hours of fighting. The coastal batteries, with few exceptions, played little role in the fighting since they had been located by Allied aerial reconnaissance and subjected to intense aerial bombardment and naval gunfire. Many did not fire a single shot before being overrun by Allied infantry and tanks.

Rommel's pet project, the coastal obstacles, had proven to be one of the most successful innovations in the German defenses. They had forced the Allies to adopt complicated and cumbersome tactics to clear gaps through the obstructions, and they had inflicted significant damage on many landing craft. On Omaha Beach, difficulties in clearing paths through the obstacles in the early morning led to a mid-morning crisis when further landings were halted due to the hazard they posed when submerged underwater during high tide. Furthermore, the obstacles forced the Allied infantry to land several hundred meters from the protection of the seawall, obliging them to cross an open killing zone in front of the German fortifications. Although the obstacles caused many casualties and led to many delays, they did not have a decisive impact on the landings, even at Omaha Beach. On the British/Canadian beaches, the coastal barrier was quickly overcome by a well-planned armored assault.



The German defenses on Omaha Beach were particularly effective due to their location on the bluffs overlooking the landing areas, as is so evident in this view from a log casemate armed with a 75mm PaK 40 anti-tank gun of the 352nd Infantry Division. (NARA)

The coastal infantry fortifications had a very mixed record. On nearly all the beaches, the German defensive positions were able to inflict significant casualties in the first hours of fighting when the Allied infantry was exposed on the beaches. Once the Allied infantry was able to reach the seawall or other cover, the rate of casualties dropped rapidly, and the vulnerability of the German defenses increased dramatically. The use of low-cost tobruks instead of the type of fully enclosed bunkers found in the Westwall made these machine-gun and mortar positions very vulnerable to close infantry assault. Had the more substantial Westwall-type bunkers, such as those near the *Festung* ports, defended the Normandy beaches the outcome might have been significantly different. However, Germany lacked the resources to create such elaborate defenses along such an extended coastline.

The combination of mines and the heavy enfilade anti-tank gun casemates had proved particularly effective, as is evident from the Allied tank casualties. On the British/Canadian beaches, a total of 22 of the *c.*100 Churchill AVREs and 12 of the 50 Sherman flails were destroyed, and many more were put out of action but later recovered. Of the US tanks at Omaha Beach, the 741st Tank Battalion lost all of their tanks but for four reserve tanks landed later in the day, and the 743rd Tank Battalion lost 27 of the 44 that landed. As one US infantry officer later remarked, the tanks "saved the day. They shot the hell out of the Germans and got the hell shot out of them."

The only landing site where the coastal defenses threatened the outcome was at Omaha Beach. The effectiveness of the Omaha Beach defenses rested on three main factors: the greater number of defenses, the greater number and quality of defending troops, and the natural terrain advantages. Indeed, Omaha was protected by as many strongpoints as the three Anglo-Canadian beaches combined, and by nearly as much infantry. Omaha Beach was one of the few sectors in lower Normandy that had defenses approaching those recommended in Wehrmacht tactical doctrine. Not only was the beach heavily defended, but the presence of first-rate infantry from the fresh 352nd Infantry Division significantly strengthened the German resistance compared to the other beaches, which were garrisoned by second-rate units. The presence of the high bluffs overlooking Omaha Beach enhanced the defenses since it provided the German defenders with clear arcs of fire along the beach, diminished the value of the seawall for defensive cover by the US infantry, and presented a significant obstruction for tank exit from the beach area except through the heavily defended draws. Unlike the other beaches, the bluffs prevented the US tanks from moving off the beaches and outflanking the German fortifications. So, for example, the 743rd Tank Battalion spent most of the day pinned down on the beach where it suffered slow attrition, instead of being able to maneuver against the defenses as was possible on Utah, Gold, Juno and Sword.

The heavy casualties suffered by the US Army at Omaha Beach suggests the difficulty the Allies would have faced had they assaulted one of the better-prepared beaches in the Pas-de-Calais area or one of the *Festung* ports. Allied planners wisely chose to use the mobility inherent in sea power to attack one of the weakest areas on the Atlantic Wall, Normandy.

The site today

For those interested in fortification, the Normandy beaches provide a wealth of interesting examples. The ferro-concrete bunkers are very durable and difficult to demolish. While visiting one of the coastal batteries along the Seine opposite Le Havre a decade ago, I noticed a bunker that had been demolished when the ammunition in the basement was detonated. This massive structure, weighing over a hundred tonnes, had been thrown in the air by the blast, landing on its roof. Removing it was obviously more trouble than it was worth, and it was sitting there, a half-century later, little worse for wear.

Casual tourists should not go wandering into bunkers unprepared. Many of the large artillery bunkers had sub-basements for storage, and over the years wooden floors have rotted, making them a natural trap for the unwary. Also, some of the bunkers are on private property and tourists are not necessarily welcome without permission. Nevertheless, there are an ample number of sites accessible to the public. A good guidebook is handy and I have found the *Battle Zone Normandy* series by Sutton Publishing to be especially well done. The Michelin 1:25,000-scale maps are also essential for pinpointing the locations of particular sites. There are numerous museums along the beach, of varying quality and content, and many monuments.

Besides the sites along the D-Day beaches, it's worth mentioning that some very impressive displays of the larger Atlantic wall fortifications can be found on either side of the D-Day beaches. Further up the Contentin Peninsula are the sites of several major naval gun batteries, particularly those at Crisbeq and Azeville. The museum at the Azeville battery is especially worthwhile as the subterranean ammunition stowage bunkers have been restored and can be visited during the tour of the facility. Restoration of the neighboring Crisbeq Battery began in 2004, and includes both casemates and kettle gun pits, along with an extensive array of ammunition and personnel bunkers. Likewise on the eastern side of the D-Day beaches, the Merville battery has been maintained largely intact since the war as a museum.

The infantry strongpoints along the D-Day beaches are less complete than the more elaborate artillery strongpoints. Many of the smaller bunkers were damaged during the fighting, and Allied engineers demolished some in the summer of 1944 when the beaches were used as ports for logistical support. Others were removed after the war when the owners of the seaside property returned and attempted to restore their homes and businesses. Many tobruks still exist, but rather than go through the chore of removing them, they were filled up, or their ring mount simply plated over. Many locations look considerably different than on D-Day due to continual residential construction as well as dune preservation efforts, which have sometimes left the gun casemates further back from the shore.

There are still some remains of W5 and other strongpoints in the Utah Beach area, with the museum occupying the center of the old strongpoint. The nearby Roosevelt Café is based on a bunker. The Utah Beach area is less heavily populated than the other D-Day beaches, and so the strongpoints to the north have been largely left intact since the war. Of course their guns and most major steel components have been scrapped. For fortification buffs, a walk along the beach to the north toward the Leclerc Memorial will reveal the remains of several strongpoints, with a rich assortment of tobruks and several types of gun casemates.

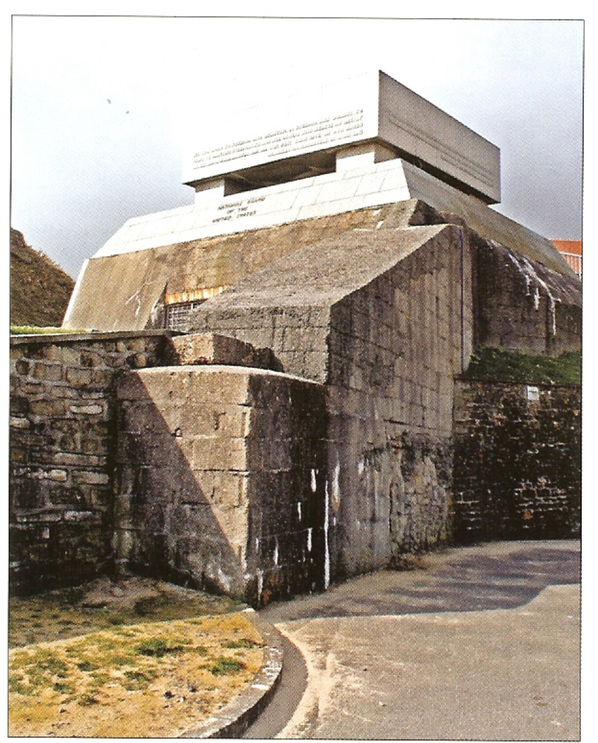
The impressive M272 casemates with 150mm destroyer guns in Longues-sur-Mer remain a popular tourist stop as one of the few well-preserved naval gun batteries along the D-Day coast. (Author)

Omaha Beach still has a number of significant emplacements including both of the H677 enfilade bunkers. The one from strongpoint WN72 on the western side of the beach at the Vierville draw serves as the base of the National Guard Memorial, but the one from WN61 on the eastern side is on private property and is less accessible. Near the western H677 bunker is also an interesting, non-standard 50mm bunker designed for enfilade fire in both directions. The 50mm gun H667 bunker of WN65 in the La Ruquet draw is still in place along with its pedestal gun, and there is a memorial to the 2nd Infantry Division in front of it. Immediately down the hill from the American cemetery near Colleville are the remains of WN62, and a memorial to the 5th Engineer Special Brigade tops the 75mm gun bunker. This is one of the few strongpoints where most of



A rusted and incomplete World War I Renault FT tank turret from a tobruk *Panzerstellung* was one of the surviving remnants of strongpoint W5 on Utah Beach. In recent years it was removed from the beach and placed in the nearby museum due to vandalism. (Neil Short)





ABOVE LEFT A view over the Pointe-du-Hoc promontory from the H636 observation bunker. (Author)

ABOVE RIGHT The deadly H667 88mm enfilade casemate in WN73 covering the Vierville draw on the western side of Omaha Beach has been preserved and used as the base for the US Army National Guard monument positioned on top of it. The original 88mm PaK 43/41 gun is still inside the bunker, but the embrasure has been blocked by grates to prevent vandalism, which also make it difficult to see the gun. (Author)

the structures have been preserved, though the many trenches and earthworks have eroded with time and are barely visible.

On Gold Beach, the 75mm casemate of WN37 at Le Hamel is still present, and there are several other well-preserved bunkers including a modified 50mm Vf600 on the seawall of WN38 on Boulevard de la Mer, and a pair of casemates from WN39 on the hill at Saint Côme-de-Fresné overlooking the beach. Longues-sur-Mer, between Gold and Omaha, remains the most impressive example of Normandy naval coastal batteries since it is the only one with its original guns still in place.

Juno Beach still has the two non-standard 50mm bunkers along the sea wall, the WN28 example at Bernières and the WN27 example at St. Aubin. One of the 50mm pedestal guns that had been positioned near the harbor entrance of Courseulles is preserved near the location, though no longer in its Vf600 gun pit. A 50mm H667 gun casemate near Mike Red Beach from WN33 is still there, but has sunken into the sand with time. The 75mm H612 casemate that had been knocked out early in the fighting by naval gunfire is still present, and the extensive damage caused by the naval gunfire is still evident.

Sword Beach still has its massive observation tower in the Riva Bella area, which is now home to the Atlantic Wall museum (Le Grand Bunker – Musée Le Mur de l'Atlantique), but it is now completely surrounded by residential housing and its associated gun positions long gone. The steel cupola of one of the bunkers of the Riva Bella casino strongpoint forms the base of a monument to the Commandos. The substantial enfilade bunker from WN18 in Hermanville-la-Breche is still in place, though it has been modified over the years and is now part of a house. Many of the bunkers associated with the Hillman strongpoint are still in place and the site has been preserved as a memorial with the interior of some bunkers accessible to the public during the summer. Likewise, the artillery bunkers at the Morris strongpoint are still present, and the Douvres radar site is an open-air museum in the summer months. One of the 50mm gun pits still overlooks the Orne River crossing assaulted by British paratroopers in the early-morning hours of D-Day.

Further reading

The Atlantic Wall has been the subject of extensive published accounts. The work of three Atlantic Wall researchers is worth pointing out for those desiring more detailed treatments of some of the subjects raised here. The French writer Georges Bernage has published numerous books on the Normandy campaign, and his recent three-book set covering the D-Day beaches listed below are especially useful. Alain Chazette's name has become synonymous with research on the Atlantic Wall in France, and his encyclopedic book on the Atlantic Wall as well as his shorter and more specialized monographs are essential reading. Harry Lippmann publishes the journal *Deutsches Atlantik Wall Archiv Nachrichten* dealing with fortification subjects, and has also published several specialized studies very useful to Atlantic Wall students.

Besides the published accounts, there are also a significant number of wartime and postwar studies that offer valuable insights into this subject. One of the less exploited resources is the Foreign Military Studies series that was undertaken by the US Army Office of the Chief of Military History (OCMH) and prepared by senior German commanders in the late 1940s. Some of those of particular relevance to the subject are listed below, along with some other contemporary intelligence studies on this subject. The author used copies at the US Army Military History Institute at the US Army War College, Carlisle Barracks, Pennsylvania, and the US National Archives and Records Administration, College Park, Maryland. The author used many other archival sources at MHI and NARA in the preparation of this book including technical intelligence reports, prisoner-of-war interrogations and unit records.

Another very useful source for researching the Normandy fortifications is the map set prepared by Allied intelligence in the months prior to the landing. Done in 1:12,500 scale, they provide excellent detail on the layout of the various German strongpoints. In April 2004, the UK Defence Geographic and Imagery Intelligence Agency republished a set of the maps dealing with the British/Canadian beaches as part of the 60th Anniversary and made these sets available for public sale.

Unpublished studies

Comparison of British and American Areas in Normandy in terms of Fire Support and its Effects, ([British] Army Operational Research Group Report 292, 1945)

German Permanent Fortifications (US War Department Intelligence Division, 1945)

German Seacoast Defenses—European Theater (7 volumes, Seacoast Artillery Evaluation Board, US Forces, ETO, 1945)

Report on German Concrete Fortifications (Chief Engineer, HQ, US Army-ETO, 1944)

US Army Foreign Military Studies Series

Dosch, Xaver, *Organization Todt: Operations in the West* (B-671)

Gersdorff, Gen. Maj. von, *A Critique of the Defense against the Invasion* (A-895)

Goettke, Gen. Lt. Ernst, *Preparations for the Defense of the Coast* (B-663)

Krancke, Adm., *Defensive Measures Against Invasion taken by Naval and Army Group HQ-West* (B-169)

Pemsel, Max J. *Construction of the Atlantic Wall Part III: The preparations in the Invasion Area 'til the end of January 1944* (B-668)

Schmester, Gen. Lt. Rudolf, *Construction of the Atlantic Wall Part IV: The Effect of Bombs and Heavy Naval Guns on the Fortified Defense System of the Atlantic Wall* (B-669)

Speidel, Gen. Lt. Hans, *Ideas and Views of Genfldm Rommel on Defense and Operations in the West in 1944* (B-720)
Triepel, Gen. Maj., *Coastal Artillery Sector 1-Contentin from 6 June until 18 June 1944* (B-260)
Weissmann, Gen. Eugene, *Flak in Coastal and Air Defense: the Atlantic Wall* (D-179)
Zimmerman, Gen. Lt. Bodo, *OB West: Atlantic Wall to Siegfried Line, Chapter 2: Preparation of Coastal Defenses Against Invasion* (B-308)

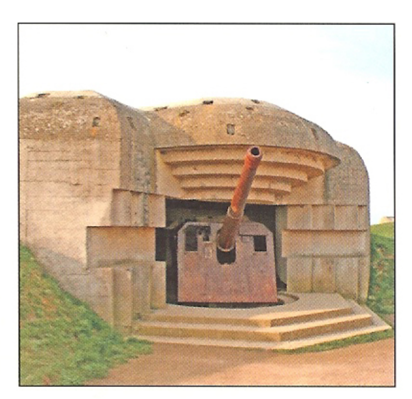
Published studies

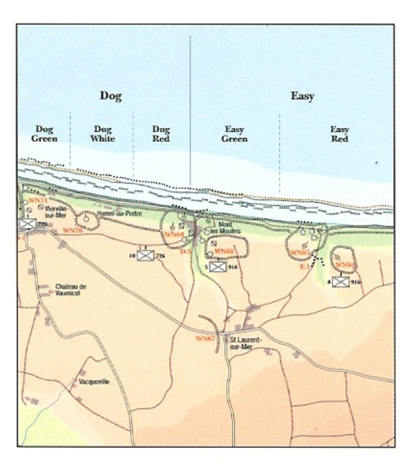
Bernage, Georges, *Gold-Juno-Sword* (Heimdal, 2003). An excellent bilingual survey of the beaches in the British/Canadian sector,
Bernage, Georges, *Omaha Beach* (Heimdal, 2002). The best single survey of the strongpoints on Omaha Beach; printed in both French and English editions.
Bernage, Georges, and Francois, Dominique, *Utah Beach-Sainte-Mère-Église* (Heimdal, 2004). The third and final volume in Bernage's excellent D-Day Beach trilogy examining Utah Beach and the areas of the US airborne landings.
Chazette, Alain, *Atlantikwall-Südwall* (Histoire et Fortifications, 2004). A superb encyclopedic survey of the major defensive works along the French coast lavishly published with black and white historical photos and contemporary photos of the sites in color.
Chazette, Alain, *Artillerie Côtière: Altantikwall et Südwall en France* (Fortifications & Patrimoine, 1999). A short, technical monograph on the types of artillery used in the German coastal defenses in France.
Chazette, Alain, *Les Batteries Côtières en France Vol. 1: Les batteries lourdes de Marine* (Histoire et Fortifications, 2004). A monograph on the naval heavy gun batteries on the French coast.
Chazette, Alain, *Le Mur de l'Atlantique en Normandie* (Heimdal, 2000). A very useful survey of the defensive fortifications in Normandy with both contemporary and historical photographs of the major sites.
Chazette, Alain, *Tobrouks Typologie: Atlantikwall-Südwall* (Histoire et Fortifications, 2004). A small but extremely detailed monograph of the many types of tobruks found along the Atlantic Wall.
Gockel, Franz, *La porte de l'enfer: Omaha Beach 6 juin 1944* (Hirlé, 2004). A recent French edition of the German memoirs (*Das tor zur hölle*) of a young soldier stationed in strongpoint WN62 on D-Day.
Kaufmann, J. E., and Kaufmann, H. W., *Fortress Third Reich* (Da Capo, 2003). A survey that helps place the Normandy defensive positions in the broader context of German fortification in World War II.
Keusgen, Helmut Konrad von, *Point d'appui WN62-Omaha Beach* (Heimdal, 2004). This is a highly detailed account of strongpoint WN62 on Omaha Beach based on interviews with the surviving veterans and the most comprehensive study of any of the D-Day strongpoints.
Keusgen, Helmut Konrad von, *Les canons de Saint-Marcouf* (Heimdal, 2005). A fine new study of the construction and combat history of the Azeville and Crisbeq coastal artillery batteries in the Utah Beach sector.
Lepage, Jean-Denis, *Les Obstacles du Mur de l'Atlantique* (self-published, 1997). A short, well-illustrated monograph on the various types of obstacles deployed on the Normandy beaches.
Lippmann, Harry, *Die Regelbauten des Heeres im Atlantikwall* (DAWA, 1986). This special edition is a small encyclopedia of the basic bunker designs common on the Atlantic Wall providing a basic architectural drawing of the design taken from the Regelbau along with key data.
Lippmann, Harry, *Heeres-Regelbauten: Bildband* (DAWA, 1995). This is a companion volume to DAWA's regelbau encyclopedia providing photographic examples of the various types of bunkers found along the Atlantic Wall.
Lippmann, Harry, *Die 5cm Kwk in Atlantikwall* (DAWA, 2003). This special edition of the DAWA journal is a very useful survey of the many different types of fortifications associated with the ubiquitous 50mm gun on the Atlantic Wall.
Ruge, Friedrich, *Rommel in Normandy* (Presido, 1979). These reminiscences by Rommel's naval aide provide the most comprehensive and essential view of Rommel's inspection of the Atlantic Wall defenses and Rommel's evolving ideas about the defense of Normandy.
Saunders, Anthony, *Hitler's Atlantic Wall* (Sutton, 2001). A fine overview of the design and construction of the Atlantic Wall including many useful photos and illustrations.
Severloh, Hein, *WN62: Mémoires à Omaha Beach Normandie, 6 Juin 1944* (Heimdal, 2004). A recent French translation of an earlier German memoir by one of the German soldiers stationed in strongpoint WN62 on D-Day.
Wilt, Alan, *The Atlantic Wall* (Enigma, 2004). A recent reprint of an academic study of the Atlantic Wall which takes a broader strategic view of the program, nicely complimenting the more numerous architectural studies.

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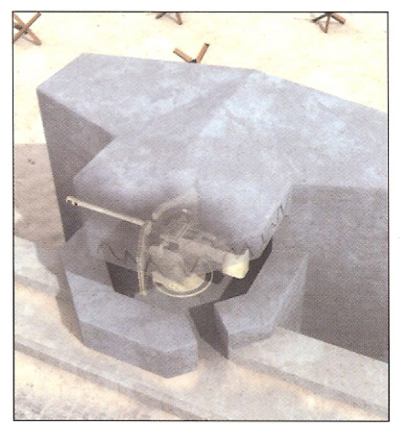
Figures in **bold** refer to illustrations

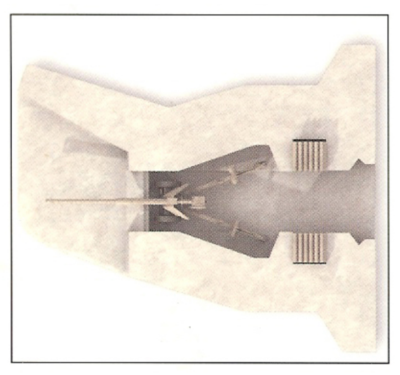
Design, technology and history of key fortresses, strategic positions and defensive systems


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D-Day Fortifications in Normandy

German defenses along the Normandy beaches were part of the larger Atlantic Wall fortifications designed to defend Fortress Europe. When Field Marshal Erwin Rommel took command of the invasion front in late 1943, he set about enhancing fortifications along the Normandy coast, believing that any Allied assault had to be stopped on the invasion beaches themselves. His most important contribution to the defenses was an extensive program of improvised beach obstructions designed to complicate any landing attempt. This book analyzes these fortifications and describes how the Allied forces overcame them on the morning of June 6, 1944.



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